4

62313/B

Vol. 2, Pt. 2

The Library of the
Wellcome Institute for
the History of Medicine

MEDICAL SOCIETY
OF
LONDON
DEPOSIT

Accession Number

Press Mark
COPLAND, J.

MEDICAL SOCIETY OF LONDON
Established
1773
11, CHANDOS ST. CAVENDISH SQ. W.

327. VII. **Of the Physiological Pathology of Insanity.—i. Remarks on Mind and Organisation.** — *A. Of the Scope of these Inquiries.* — The human frame respires, digests, thinks, wills, and acts: in a few hours afterwards, and often without any obvious cause, it performs none of these functions; and, in a few hours more, it falls into dissolution. These phenomena are familiarly known to us; and, although they are considered by all to form a part of the established order of the universe, yet they must have engaged the reasoning powers of man from an early period of his social history, and have been amongst the earliest subjects of philosophic discussion. As the cause of these occurrences is necessarily embraced by speculations as to the origin and nature of mental as well as of corporeal disease, so it may be supposed to have always been a matter of deep reflection to physicians from the earliest ages. The constitution of the human mind leads it to search after first principles, in order to explain the operations continually taking place within and around it; and the hopes of obtaining information respecting the source of the deranged states to which itself, as well as its associated frame, is liable, and even of discovering the nature of its own origin and connections, seriously interest a class of inquirers whose occupation naturally suggests these considerations. Yet, although these inquiries more immediately concern the practitioner of medicine, especially as respects the more obvious changes which mind and its allied matter present to his view, still the intimate relations of both the one and the other, the nature of the connection subsisting between both, and the more removed links of the chain which binds them to their first cause, and to the universal system of nature, are no farther disclosed to him, than to any one else who patiently scrutinises the objects which come under his view. As man did not create himself, so neither can the faculties with which he is endowed inform him, of themselves, even plausibly, either as to their own formation, or as to the original production of the frame which manifests them, or as to the connections which the one has with the other, or even regarding the ultimate cause and circumstances of the apparent dissolution of both. How can the machine explain the principles of its peculiar construction, or demonstrate the views which actuated its maker? How can we expect the powers of mind, which cannot be supposed to have been formed without a cause, to acquaint themselves of their own modes of being anterior to their present state of existence? and how much less can they furnish information respecting the nature of that cause from which they necessarily derived their origin! They may, however, enable their possessor to recognise the phenomena which take place within and around him. They can mark the modifications and the sequence of operations characterising their own constitution, and the properties of substances by which they are surrounded; and they may even expatiate beyond the objects of sense: still the powers of human intellect, exalted as they are, can neither, through their own instrumentality, arrive at a knowledge of their own intimate nature, or of the manner in which they first came into existence; nor explain, satisfactorily, the kind of connection which they hold with their first cause, on the one hand, or with the matter with which they are associated, on the other. Notwithstanding that the field is thus narrowed, it will be still found sufficiently extensive for exact research and profitable cultivation.

328. Although speculations respecting the nature and the material alliances of mind are sufficiently unprofitable, when directed to such topics as the above; yet, as they disclose points of great utility, when they are pursued in a different direction, they should not be altogether discouraged. It is to the medical philosopher that these points are especially manifested, and hence he becomes more particularly interested by discussions in which they are in any way involved. But, as his daily researches and occupations are apt insensibly to bias the opinions he may form as to those subjects, so his inquiries will often betray, upon strict examination, more of the *idola tribûs*, than of exact deduction. Besides this important source of error, there are others, in which he partakes in common with all inquirers. How very few physiologists are truly sound reasoners and exact philosophers! How often are the first requisites of valid argument overlooked, even at the outset of our researches after truth! How few, among those who peruse the discussions to which these researches lead, discover the sources of error! and how many are carried along with the sophistries which flow from these sources!

MEDICAL SOCIETY OF LONDON
11 CHANDOS ST. CAVENDISH SQ.
Estab 1773

329. These objections, although strictly applicable to those topics to which I have alluded as being placed above the reach of our faculties, have, however, no reference to the correct observation of the healthy manifestations, and of the derangements of mind. The former topics, at the best, can be considered, from their very abstract, or rather, inscrutable, nature, as matters of curious speculation; the latter, being objects of consciousness and experience, are the true subjects of philosophy, and, from their involving the welfare and existence of human beings, are matters of practical importance in the scientific prosecution of our profession.

330. As our knowledge respecting life and mind can be derived only from a careful examination of the phenomena which organised bodies present, — for we have no experience of the former unassociated with the latter, — so our acquaintance with the manifestations of mind can be obtained only by an intimate investigation of the nervous system, and of its functions, in the higher animals and in man, and by attending to the objects of our consciousness. Of all the opinions which have been entertained as to the cause of vital phenomena, there is none in which these phenomena are not ultimately ascribed to one or other of two causes; namely, either to a certain organism of the materials of which the visible structure of the animal is composed, or to a principle totally distinct from, yet most intimately allied or associated with, it; which principle seems to have suggested itself to all mankind, and to have received a distinct appellation. Opinions have necessarily been similarly divided as to the cause and mode of existence of the mental manifestations; — the one being, that they result from the organisation of the brain and nervous system; the other being, that, like vitality, they are distinct from the structures with which they are associated, and which are the instruments only of their operation. Hence, physiologists are divided on this subject into two classes; — the

one ascribing all vital and mental phenomena to organisation; the other attributing it to a distinct principle — to vitality — allied to organisation, in which state of alliance only is it subjected to observation, and made an object of investigation and of experience. Accordingly, the one class believes that the range and power of intellect entirely result from organisation; the other considers that organisation is only the medium or instrument of mental manifestation, whilst it continues to be actuated by life — that the powers of mind are the result of the vital endowment of the brain. Although opinions on this subject may be thus classed, according to their general and fundamental principles, yet they vary remarkably in their subordinate particulars — owing chiefly to their discursions beyond the range of consciousness and observation, and into the regions of imagination and wild speculation.

331. The functions of the brain, in connection with the doctrine of life, have attracted the attention of philosophers from a very early period; and, during the last century, they have engaged the researches of some of the most acute inquirers who have "interrogated nature." The progress of our knowledge, however, in this very interesting but most difficult field has not been equal to the growing zeal with which it has been cultivated. This want of success is entirely owing to the circumstances already alluded to, — to the obstacles which beset us when entering upon investigations in which we encounter the mysterious union of mind with matter, and which relate to the more intimate states of both, and to their mutual influences in different and often in contradictory circumstances and aspects. The operations of the nervous system, possessing, as it does, so extended a connection with the mental powers on the one hand, and with the corporeal functions on the other, and reciprocally receiving and communicating influence during health and disease, could not be accurately traced, even in the more evident phenomena, without some reference to the sources and relations of vital and mental manifestations; and hence have sprung up various and conflicting hypotheses, which have demonstrated little beyond the narrow limits of our knowledge and of our powers. These humiliating considerations obtrude themselves, when we view the numerous speculations which have been entertained respecting life and organisation, and their relations to mental manifestation, from the earlier dawn of philosophy to the present time, when we consider the conclusions to which many of them lead, and when we reflect upon the small progress that has actually been made in this department of knowledge. How little has been added even to the physiological part of these researches, notwithstanding the self-felicitations of some recent inquirers, since the writings of Galen! how much of what has been supposed to have been discovered, still remains open to contradiction, cavil, and doubt! and what has the science of mind gained from the works of their modern followers, in addition to what appears in the discordant theories of Plato, Aristotle, and Epicurus! It cannot be a matter of surprise that human intellect has been tossed for many ages upon an ocean of uncertainty respecting its nature and relations, seeing that it was never guided by any sound principle of philosophising, by which it might have been navigated into a safe haven. Until the philosophy of Bacon extended, in this country, its influence to the science of mind, but little care was taken to attend closely to the intimations of consciousness, and to investigate the nature, the extent, and the mutual relations of our faculties. The more precise attention which has recently been paid by some writers in this country to the objects of consciousness, and to the origin and history of our ideas, whether those which are derived from our senses, or those resulting from reflection, will serve to guide our speculations to conclusions more correct, and certainly more ennobling, than many of those are capable of accomplishing, that have been entertained in modern times.

332. *B. The opinions of the Ancients respecting mind and the vitul phenomena* were sufficiently vague; and yet, when strictly examined, not much more so than most of the views promulgated in modern times. Ψυχη, *anima*, vital principle, or soul, according to some, were employed by them to express the cause of the vital actions; the term ζωη designating the effect of that cause. Democritus, Epicurus, and the Stoics considered the soul to be corporeal, or material; but differed as to the matter constituting it. Hippo maintained that it was water; Democritus, that it was fire; Heraclitus, that it was a vapour, or exhalation; and the Stoics, that it was warm or ignited air. Of those who believed the soul to be incorporeal, some considered it mortal, and others that it was immortal. Thales said that it was the origin of motion, and always in motion; Pythagoras, that it was a self-moving monad; Plato, that it was conceivable only by the understanding; and Aristotle, that it was the first εντελεχεια, or element bestowing on others the possibility of life. The Manicheans imagined that there is but one universal soul, which is distributed in portions to all bodies. Plato and others maintained the existence of an universal soul, by whose influence all things existed; but that living creatures possessed separate souls, which have a threefold constitution, — reason, placed in the head as in a citadel, passion in the chest, and desire in the abdomen. The Greek philosophers, who taught the immortality of the soul, generally believed in its transmigration. Galen, adopting the doctrine of Plato, considered the soul to possess three faculties, located in the three cavities of the body, — a ruling or rational one in the head, a vital one in the thorax, and a natural one in the abdomen. These distinctions were long entertained in medicine, together with the subordinate faculties which Galen supposed to preside over particular organs, and which Harvey denominated *sensus proprii*, and Blumenbach, more recently, *vitæ propriæ*.

333. The Greeks, who believed in a vital principle, had long been accustomed to arrange its energies under different heads, as the φρην and the ϑυμος; the former implying the intellectual and voluntary functions, the latter the involuntary, which originate either in sensation or instinct. Some of their authors arranged the faculties of life under three heads, — the νους, φρην, and ϑυμος; the first comprising the intellectual and rational powers, the second those operations supposed to belong to the viscera of the thorax, and the third those spontaneous functions termed organic or vegetative, belonging to the organs of nutrition

45

[illegible] with the ancients. The Latin writers employed the words [illegible], and [illegible] as [illegible] corresponding with those attached to the words used by the Greeks; although Lucretius, in his development of the Epicurean philosophy, is by no means precise in the use of them, and more generally employs mens and animus as synonymous terms, or very nearly as such.

304. Leucippus, according to the explanations of [illegible], was the first who constructed a system of materialism. He ascribed organization and the vital and mental phenomena displayed by it, to combinations of minute and invisible atoms, possessed of various shapes. He does not attempt to show how these shapes co-operate to form either the animal or a plant. He merely asserts that the elements produce both from a combination of chance and fate, or, [illegible] many worlds were formed, by necessity and [illegible] of the void. This is one of the notions of [illegible] by some of the [illegible] physiologists. It being impossible to explain the establishment of organization and mind, and indeed of the universe, by means of the doctrine of chance alone, a being of superior power was introduced and invested with great authority. This being, to be conceived similar to atoms, not in figure, nor in any of their properties, was called Destiny. "This doctrine," observed Dr [illegible], "being found inconvenient to [illegible] the hypothesis that excludes a deity, [illegible] by many of the moderns, and [illegible] with great power, [illegible]. The events and things [illegible] from a state of [illegible]; and [illegible] is equally to have [illegible] by a superior power, which some call Fate, and others Necessity." We presume [illegible] which Democritus and his followers [illegible], in their speculations, as a [illegible] being, to which they might ascribe the [illegible] by which the world is governed. [illegible]

[illegible]

[illegible] The opinions of [illegible] were evidently directed against the vulgar notions of the existence of divinities endowed with moral attributes; but they in no way influence the argument in proof of a Deity, and a pure system of religion. He admits that it is impossible to disregard the religious feelings and impressions which are interwoven with the very elements of our constitution; that no nation or individual is entirely without them; that some notions of divine beings are quite irresistible; and that they will spring up in the human mind [illegible], without the [illegible] aid of education. "Quae est enim gens, aut quod genus hominum, quod non habeat, sine doctrina, anticipationem quandam deorum?" [illegible]

306. [illegible] has been adopted by [illegible] and more especially by [illegible] the manifestations of mind are [illegible] with a brain, and are [illegible] of this organ, [illegible] That the [illegible] of the molecules of matter [illegible] some powers of mind, [illegible] they cannot explain. [illegible]

placed in the abdomen. The Latin writers employed the words *mens*, *animus*, and *anima* in senses nearly corresponding with those attached to the terms used by the Greeks; although Lucretius, in his developement of the Epicurean philosophy, is by no means precise in the use of them, and more generally employs *mens* and *animus* as synonymous terms, or very nearly as such.

334. Epicurus, according to the explanations of Lucretius, was the first who constructed a system of materialism. He ascribed organisation, and the vital and mental phenomena displayed by it, to combinations of ultimate and invisible atoms, possessed of various shapes. He does not attempt to show how these shapes co-operate to form either an animal or a plant. He merely asserts that the elements produce both from a combination of atoms; and that, in his time, many animals were formed, by showers and sunshine, out of the mud. This is one of the modes of spontaneous evolution contended for by some of the modern German physiologists. It being impossible to explain the manifestations of organisation and mind, and, indeed, of the universe, by means of the doctrine of atoms alone, a being of superior power was introduced, and invested with great authority. This being, who belonged neither to atoms, nor to elements, nor to any of their properties, was called Nature. "Her existence," observes Dr. Barclay, "being found indispensable to all the hypotheses that exclude a deity, she is still preserved in her high office by many of the moderns, and invested with great power, incessant activity, and uncommon prudence. She creates, and brings whatever lives to a state of perfection; and does it all according to method, or agreeably to laws imposed upon her by a higher power, which some call Fate, and others Necessity." We perceive the continual want, which Epicurus and his followers experienced, in their speculations, of a first cause, one Supreme Being, to whom they might ascribe the various laws by which the world is governed; and we observe the manner in which his place is supplied by properties, powers, or principles, assumed by them to explain phenomena, which, notwithstanding this assumption, must be ultimately referred to one great first cause.

335. Lucretius, the enthusiastic expounder of the doctrines of Epicurus, after attributing all things to the formative and productive faculties of his atoms, of earth, of the elements, and of Nature herself, thinks, nevertheless, that all must be regulated by diversities of seeds, or of organic particles, each endowed with a peculiar *secreta facultas*, which makes them both living and organic. He is also obliged to conclude that the soul is deduced from a seed — that it is from its seminal qualities, and from this radical difference of its faculties, and not from a difference of organism in the body, that the lion is fierce, the fox crafty, and the stag timid. He rejected the opinion of those who believed that animating principles organised animal bodies; and because he could not see how they did it, he therefore concluded that they did it not. Aware, however, that he might fairly be challenged, in his turn, to explain how his seeds were originally organised, he is quite at a loss, and, forgetting the mechanical properties of his atoms, has recourse to heat, air, and the invisible power of the wind; being, nevertheless, obliged to call in to his aid a certain mobile and active principle, that distributes motion and sensation to them all; but the origin of this principle he cannot explain. The opinions of Lucretius were evidently directed against the vulgar notions of the existence of divinities endowed with moral attributes; but they in no way influence the arguments in proof of a Deity, and a purer system of religion. He admits that it is impossible to disregard the religious feelings and impressions which are interwoven with the very stamina of our constitution; that no nation or individual is entirely without them; that some notions of divine beings are quite irresistible; and that they will spring up in the human mind as things indigenous, without the adventitious aid of education. "Quæ est enim gens, aut quod genus hominum, quod non habeat, sine doctrina, anticipationem quandam Deorum?"

336. *C.* Of Modern Materialism.—It has been urged by all the favourers of Epicurianism, and by many of the followers of Gassendi and Hobbes, but more especially by Buffon, Priestly, Darwin, Maupertuis, Blumenbach, Cabanis, &c., that, as the manifestations of mind are never met with, unless connected with a brain, and are suspended by compression of this organ, so the phenomena generally attributed to it are the result of its organisation. That the combination and reciprocal action of the molecules of matter constituting the nervous fabric, of themselves, and unaided, produce the various powers of mind, is the proposition which they support, however paradoxical it may seem, but which they cannot explain. The possibility of such combinations and reciprocal actions of the molecules of matter producing, unaided, such results, is not shown by any analogy, or by any proof. If mind proceed from certain associations of organic particles, why has not some opinion as to the process been hazarded? Does our experience respecting the mutual influence of either the elements or the aggregate of matter furnish us with resulting phenomena, that can in any degree approach to the lowest manifestations of either vitality or mind? If mind be supposed to be derived only from the combination of these particles, or from the operation of certain of their products upon each other, it may be asked, whether it be possible to conceive that matter, in such a state, possesses qualities of which the elements, or even the individual atoms, are divested? and whether experience has furnished us with any instance of mental, or even of vital, phenomena, proceeding from such combinations, when matter is removed beyond the influence of bodies, or sources already endowed with life? If, on the other hand, properties necessary to the generation of the mental faculties be conceded to every particle entering into the formation of the encephalon, how can the idea of the subdivision of the powers of mind, to such an extent as matter admits of, be allowed? Can the supposition be for a moment entertained, that every molecule of this admirable organ has a fractional part of mind connected with it? Many of the materialists, in order to account for the manifestations of mind, have had recourse to so many suppositions respecting the nature and endowments of matter, in respect either of its elements or of its aggregate, as were tantamount to a negative admission of the principle of vitality against which they had been arguing, — with this notable difference, however, that they required the operation of numerous agents, instead of more

philosophically referring these manifestations to states of this first and noblest constituent of our nature. The genius of Leibnitz saw the difficulty that stood in the way of pure materialism; and, in order to give the atoms of matter activity, and origin to the mental phenomena, he had recourse to the εντελεχειαι, or spirits of Aristotle.

337. Cabanis and the later French physiologists adopted the doctrine of organism; and, in order to supply the want of a foundation to their structure, they seized with avidity upon the opinions of Gassendi respecting the origin of our ideas. Their hypothesis still required support; and, in order that it might receive such from a name looked upon with deference throughout Europe, they unjustly imputed to Locke, opinions which belonged to the two celebrated opponents of Des Cartes already mentioned. Much of the credit which this doctrine acquired in France and in Germany arose also from the neglect with which that class of our ideas derived from reflection was uniformly treated — from the circumstance, that the evidence of the senses and the information derived from experience were considered as the sole foundations of our knowledge. It is very justly remarked by Dr. Barclay, that, if it be supposed that all knowledge is derived from the senses, and that matter is the only object of sense, it must be evident that, on this hypothesis, we cannot with propriety ascribe phenomena to any thing but matter. But on what data is matter, in general, pronounced to be an object of sense? Its ultimate particles certainly are not so; and its aggregates, though many of them certainly are, seem but little calculated to account for life and organisation; and, at any rate, they by no means account for their own formation. But, whatever may be their formation or their consequences, they must be ultimately referred to those primary molecules which are utterly beyond the reach of our senses. Besides, if matter be supposed to include a variety of substances, or rather, every thing that has an existence, it is, on this supposition, no explanation of a phenomenon, to say merely that it proceeds from matter. He who hazards such an assertion, should point out the particular species or the peculiar arrangement from which it proceeds, otherwise he gives us no information, but that it proceeds from something unknown, and which he would wish to be called matter. We may, therefore, safely question the accuracy of the opinion, that all our knowledge is derived from the senses: as well might we say, that arts and manufactures are derived from the doors and windows of the houses by which the raw materials enter, to be afterwards prepared by the industry and skill of the workmen.

338. As our senses are prior in existence to our experience, we have still more reason to question another opinion, brought in support of materialism, namely, that all our knowledge is founded on experience; for a great number of our ideas are not directly derived from our own experience, but rather from the evidence of testimony. Besides, prior to experience, we possess a species of knowledge, which, as to self-preservation, is much more essential than any that we afterwards acquire, which seems to proceed directly from the Author of our being, and which, so far from being the result of our own experience and observation, is the very groundwork on which they are founded. Of this kind is the knowledge immediately derived from those natural instincts and feelings, which regulate the various functions of our system, which stimulate our intellectual powers, and which, according to their strength or their weakness, their healthy or their diseased state, impart a character to our experience, our observations, our reasonings, our conclusions. When we wish but to move a limb, by what experiment or process of reasoning do we come to know the necessary muscles, the particular nerves proper to excite them, or the amount of energy to be imparted to each, so as neither to exceed, nor to fall short of, the object in view? If we take a view of the instincts which guide animals to the selection of food suited to their digestive organs, — to know the appropriate means to overtake, subdue, or ensnare other animals, — to provide against seasons of scarcity, by laying up stores, — to know the distant countries and the different climates where food is in plenty, and to which they can migrate, — to learn that they can sleep during the winter without any food, and to select their retreats so as to avoid discovery, — to calculate the time of sexual intercourse, with reference to the periods of gestation, so that the birth of their offspring may coincide with the seasons suited to their early and future exigencies; — if we consider the age at which most of these phenomena are manifested in the classes of animals to which they severally refer, and the circumstances with which they are generally associated, and if we analyse the entire class of our instinctive desires and feelings (see note, § 66.), as manifested both in man and in the lower animals, we must necessarily infer, that the sources of our knowledge are much more extensive than the supporters of organism would lead us to believe. Let us, therefore, as Dr. Barclay has well enforced, give due importance to these primary causes of action and feeling; for whatever our reasonings or opinions may be, we will find them linked with some one or other of these original springs or energies of our constitution, — with some instinct, appetite, or passion, — with some one of those sources of action, which not only are prior to all our experience, observations, and reasonings; but, what is more, are, during our lives, not infrequently regulated by circumstances, external and internal, over which we have little or no control.

339. If such be the facts, what, then, it may be asked, is the use of experience, observation, and reasoning? The use of these in man is still great — great in proportion to the developement of the intellectual powers. These, and the instincts, can, to a certain extent, mutually aid, oppose, and regulate one another, so as to preserve a juster balance in the moral and social system. The instincts too, as well as the intellectual faculties, may be diseased, may be perverted, or may be deceived, as they have been shown to be in most of the forms of insanity; and in all cases where they point only to immediate objects, or act according to immediate circumstances, they give no warning of the snares, the troubles, and the dangers which are the consequences of indulgence. By following the impulses of instinct, to the neglect of experience and reason, passion and desire lead to acts of moral insanity. As we are able to ensnare, capture, or destroy the lower animals, by taking advantage of their unguarded, unsuspicious

instincts, so we ourselves are often ensnared and captured, or ultimately even destroyed, by excessively indulging many of our instinctive desires and moral emotions, and by neglecting the dictates of experience, just reasoning, and rational observation; or, in other words, from a want of that discipline of which the instinctive and moral feelings are susceptible, and which we have the means of administering, by possessing intellectual and reflective powers in a higher degree of perfection. The control of those feelings, however, is in proportion, not only to the perfection of these powers, but also to the use made of them.

340. I have been thus particular in noticing the opinions of Epicurus, because they have the same basis, and involve the same principles, as modern materialism; and in showing that the doctrine of Gassendi and Hobbes, which ascribes all our knowledge to our senses, and which has been seized upon by every writer of note who has more recently written in support of organism, is altogether unsound. — The scope of this work allows me not to pursue further this part of my subject, or to notice the several modifications of materialism which have been proposed in modern, and even in recent, times. This is, however, the less necessary, as what has been already advanced will show the complete insufficiency of any theory based upon organism to account for the phenomena of life and mind.* But I am compelled to examine briefly a modern doctrine which has met with a very favourable reception both in this country and abroad, and which has been applied, by those who favour it, to the study of insanity: — I allude to the doctrine of Gall, or Phrenology, or Cranioscopy.

341. ii. Of Phrenology. — Of this doctrine, I may observe generally, that some of its principles are founded on opinions which have been, and still are, very generally admitted by physiologists; whilst others, which especially belong to it, are assumptions, which even those who favour it cannot pretend to be proved, or at least expect to be admitted, by sound reasoners, as data sufficiently established. Those who support phrenology, appeal to facts, assert that it is eminently a science of observation and rational induction, and, with apparent candour, call upon those who oppose it, to make themselves acquainted with its principles and details, and then to observe and judge for themselves. This seems rational; but, unfortunately, when the advice is followed, and when the results militate against their theory, they endeavour to rid themselves of the difficulty, by asserting that the observer is mistaken, and unacquainted with the principles of their doctrine, — thus virtually denying that any one can be acquainted with it, unless he be likewise a convert to a belief in it. When, however, pressed by facts which seem irresistible, they have so many ways of eluding the difficulty, and especially by means of their notions respecting the *activity* and *volume* of the individual organs into which they have divided the encephalon, and the developement or activity of controlling, of opposing, and of co-operating organs, that there is at once an end of all argument with them. But the ability and eminence of many of those who have written in support of this doctrine, as well as the reception it has met with, and especially the very intimate relation in which it stands to the pathology and treatment of insanity, require that I should enter upon a more intimate examination of it.

342. That the seat of mind is the brain, is proved by a general consciousness that this is the case, or by a similar testimony to that of the locality of the various senses; and it may be further proved by experiment, — as by dividing any of the nerves, and by observing the resulting phenomena. The same inference is to be deduced from the injuries and diseases to which the brain is liable; by the different grades and forms in which the mind is disturbed, impaired, or its phenomena cease altogether. Whether we can more precisely assign the locality of the mind, or the localities of its different manifestations, than by saying, in general terms, that the seat of mind is the brain, is a question which has been long agitated; and it is upon the affirmation and negation of it, that the believers and unbelievers in phrenology rest their doctrines. It was formerly supposed that the mind was located in the pineal gland; but, as no evidence of this could be adduced, and as it could not possibly be proved by experiment, or supported by observation in disease, the opinion shared the fate of similar hypotheses. That the several faculties and propensities of mind reside in respective portions of the brain, is the fundamental proposition of phrenology. But, as Dr. Pring (*Sketches of Intellectual and Moral Relations*, 8vo. London, 1829, pp. 71.) has well observed, if we seek for the same evidence in support of this proposition, which showed that the brain in general is the seat of mind, no part of it will be found. In our perceptions of the objects of sense, — in the operations of mind, — in the study of music, languages, mathematics, &c., — in the exercise of our passions or propensities, — we have no consciousness of the portion of the brain brought into action; and we cannot thereby assign any of these to one part of this viscus, rather than to another, or distinguish whether the seats of these manifestations or states of mind are different, or the same for all.

343. The proofs of locality afforded by disease or injury are equally inconclusive — or, rather, are not to be found. Extravasations of blood in apoplexy will suspend the mental phenomena, or cause both them and life to cease, in whatever part of the brain they may occur. Whether such extravasation take place in the cortical, or in the fibrous structure, or in any situation; whether fluid is effused from the membranes, or into the cavities; and whether the organic effects of congestion, concussion, fractures, depressions of the cranial bones, inflammations, or softening of portions of the brain, or the developement of tumours, be contemplated, — we find only this common result, that all the phenomena of mind are more or less modified, or suspended; or they cease altogether. They may, however, be almost unaffected by some of these lesions; or some faculties and propensities survive, while others are lost; still the preservation or the loss does not observe any regular connection with the integrity or injury of any given portion of brain. — But to state with more precision and detail the doctrine

---

* For an account of the various hypotheses which have been advanced to account for life and organisation, see the work of Dr. Barclay on this subject, and two articles by the author, in the 17th and 18th vols. of the *London Medical Repository*, 1822.

of GALL: — It is asserted — 1st, That the mind presents a certain number of faculties, passions, and propensities, all of which are individually exercised by distinct portions of brain,— which portions are the *organs* of these faculties or passions; — 2d, That these functions are performed, in their respective seats, in different degrees, in the same or in different persons; — 3d, That the strength or perfection of these functions or faculties is in proportion, individually, to the *size* of the organ, and to the *activity* with which it performs its office; — 4th, That these organs are situated in the superficial parts of the brain; — 5th, That in proportion to their size is the protuberance of the skull over them; — 6th, That by an examination of these protuberances, the size of the organs, and consequently the degree of perfection of their respective functions may be estimated; — 7th, That the individual functions may be developed or restrained by education; — 8th, That the preponderance of one or more of them may be repressed by the cultivation of others; — 9th, That the propounder of this doctrine was fortunate enough to discover the great majority of the situations in which the individual manifestations of mind are located, and that the rest have been since ascertained; — and, 10th, That the system is applicable to the prevention and treatment of insanity; mental disorders confirming the truth of it. I proceed to remark briefly on each of those assumptions.

344. *a.* The enumeration of the faculties may or may not be correct. Some of them are not simple, or even original, states of mind, but, as certain of the propensities, arise out of several, which more or less subserve to their individual formation. Then, as respects others, which are considered original and connate, the sphere of action is either too extended or too limited, whilst no attempt is made to trace them to simpler and more original manifestations. The division of the faculties by the phrenologists, moreover, is such, that explanations of character conformably with it, would lead us often to infer, that an individual both has and has not a particular genius, faculty, or endowment, or that he possesses opposite endowments in equal grades of perfection and activity, or that, both being equally developed and active, the balance vacillates between them till some circumstance affects a related faculty, and thus causes it or its opposite to kick the beam. The division of the faculties is opposed to just views of philosophising, and is altogether empirical.

345. *b.* That the faculties and propensities have their seats in particular portions of the brain, which portions are respectively the organs of the faculties and propensities, are two assumptions equally ill-founded with the foregoing. As the faculties of the mind are not distinct entities, but merely states or affections, arising out of impressions on the special or general sensibility, or different modes of consciousness, according as these impressions are internally and externally associated or related, so it is unnecessary to inquire whether these faculties have appropriate or respective seats in the brain. Our experience of what constitutes distinctness of function, in connection with organisation, does not permit us to extend the appropriation of function and organ to the mind and brain any further, than that our consciousness instructs us, that the brain is the seat of mind, or the organ which is most intimately related or associated with its various states and affections; but it by no means informs us, nor even suggests, that these states or affections are the functions respectively of particular parts of the brain, or that these parts are the organs individually destined to perform appropriate offices. Having no proof arising out of our physical and mental constitutions, how then are we to obtain any, or is any conclusive evidence to be obtained? We cannot obtain it either analytically or synthetically, compatibly with the continuance of life. Evidence, therefore, of the loosest kind — analogies, merely, have been advanced, in support of this assumption. As disease or injury has been found to destroy the functions of sense, when implicating either the origins or courses of their nerves, so it has been supposed, from this circumstance, that there are particular localities for the powers of the mind. But this, instead of suggesting the existence of such localities, merely indicates, that the impression from distant parts, or distinct organs, is conveyed by certain nerves, which, when diseased or injured in any part, from their origins to their terminations, are either rendered incapable of transmitting sensation so as to become an object of consciousness, or transmit it in a state of disorder, or imperfectly. Without further pursuing facts which abundantly suggest themselves to every physiologist and pathologist, it may at once be averred, that the proofs in support of the localisation of the faculties of the mind are not merely defective, but altogether wanting, and that the loose analogies which have been advanced, are either inapplicable, or admit of various explanations, none of which come in aid of the proposition.

346. Even admitting that the powers or faculties of the mind exist as separate essences or functions, and that they occupy appropriate seats or spheres of the brain, it by no means follows that these seats are the *organs* which give rise to these powers. The viscera discharging specific offices are denominated organs, because they are the agents, by the instrumentality of which certain results or phenomena take place when actuated by life; and we perceive a very obvious organisation appropriated to the office performed in the liver, kidneys, lungs, heart, &c.; but we are unable to show by what arrangement of the substance of the brain, a mathematical calculation, a process in algebra, a philosophical reflection, a cautious action, or a flight of imagination, is produced. Indeed, the question, whether certain states of mind, which the phrenologists have located in the brain, are really so seated, or should not rather be assigned to different parts of the nervous system, as they have been by most of the ancients, and by many modern physiologists, has not been duly considered by them, but at once have been assumed as *functions* of portions of the brain, which they have also assumed without any sufficient proof as *organs* individually appropriated to the performance of a certain function, and to that only.

347. *c.* It is asserted that the functions are individually exercised in different degrees of activity in the same, or in different persons; but is this owing, when occurring in the same person, to an accidental change in the state of the respective organ? or is the organ under the control of volition? or both? How does volition act upon each of the numerous organs? how is it located so as to bring

each or all into play? and does it run from one to another? or, seated in the pineal gland, or somewhere near, does it reach out certain appliances with which it is provided to each, and thus strike them in every variety of combination? If volition acts upon one, it must necessarily act upon all, or any intermediate number, in every possible mode of combination; and if this were the case, and the volition or desire comprehensive, how immense, both intellectually and morally, would be the result! If it be said that the will can act upon one organ only at a time, how then happens it, that several must often be in operation, to produce the effects which the phrenologists admit as often occurring? That persons may have talents for particular pursuits, or certain propensities, in a greater degree than others, is one of the oldest and best established remarks respecting the human mind. Our experience, however, warrants only the expression, that there is a stronger or a more favourable disposition in some minds, to certain operations, propensities, and passions, than in others. But, as Dr. PRING has observed, that the existence of any one propensity or faculty is independent of all the rest, or requires to be spoken of as more than a disposition of that which is expressed in the gross as the mind, cannot be inferred, — 1st, because the disposition which makes the propensity related with its objects, has the character of a common principle; — 2d, because the objects of a given faculty are presented to it through media — the senses — which are common to all the other faculties; — and, 3d, because one ability is not perfect, or in reality does not exist, without the concurrence, more or less extensive, of others. In truth, there seems little more reason for supposing that the different phenomena of mind are produced by numerous distinct faculties, than that it requires different hands to play different tunes upon a musical instrument.

348. *d*. That the strength of the faculty is in proportion to the size of the organ, is another fundamental proposition of the phrenologists, but an assumption, equally with the preceding, supported only by loose analogy. The only analogical proofs, indeed, which can be adduced in favour of it, are derived from the muscular and nervous systems; and these do not fully apply to the brain: for it cannot be stated with truth, even as a general proposition, that muscular strength, either in man, or in the lower animals, is in the ratio to the bulk of the muscles; nor is it universally true, that the largest nerves convey the greatest degree of nervous energy,—although they generally may be inferred to do this, since they are composed of a greater number of fibrils, each of which, or of the fasciculi into which they are arranged, transmits a certain amount of power, or rather of stimulus, to already inherent power in muscular parts. Moreover, sensibility, which is a principal property of nerves, is not manifestly greater or more acute in a large nerve than in a small one, or in a branch much less than a trunk. The phrenologists are themselves aware of the weakness of this part of their foundation, inasmuch as they have recourse to *activity*, or intensity of action, to explain phenomena which they cannot account for by means of volume. That the size and activity of function of the brain may be connected with the degree of mental manifestation, either singly or conjoined, may or may not be the case. The affirmative has been believed in for ages,—chiefly from the loose analogies already alluded to, and from others presented by various organs or parts. Still, this is the only part of the system which retains any portion of plausibility, upon a strict examination. The alternative, however, of size and activity, is so readily resorted to against the opponents to the doctrine, and so easily suggests itself, as to preclude all argument respecting alleged facts, in proof or disproof of the system, and to betray the mind of the espouser of it into a state of blind belief. It is obvious that, as long as size, relative and absolute, and activity and inactivity in every grade, are made bases of the doctrine, no fact, however faithfully observed, can be adduced, that will shake the faith of those who have embraced it; although every one who will give these articles of their belief due consideration, must come to the conclusion, that they actually negative the propositions they are intended to support: for, if activity of function be admitted as respects certain of the organs into which they have divided the brain, inactivity must be conceded to others, or even to the same organ on different occasions; and, if these states are so important, why have recourse to volume or developement as the principal indication of endowment or function? The shiftings between these states, in argument respecting alleged phrenological facts; the influence of allied or related propensities or faculties on those which are most prominent or most deficient; the countervailing operation of opposing organs; and the different interpretation that may hence be put upon the *ensemble* of these organs as manifested by the cranium,—must render the study, even if tolerably based in truth, as one, at the best, furnishing opportunities of vague guessings into character, in which no two speculators out of many may agree, or arrive at any thing like a just conclusion.*

349. *e*. The localisation of the organs, and consequently of the faculties, in the external or more superficial parts of the brain, whether suggested merely by a desire of detecting their volumes, or by the circumstance of these parts presenting a greater diversity of arrangement, or structure, or form, is immaterial, inasmuch as they both equally fail in supporting the assumption. That the superficial and cineritious portions of the brain are more intimately related with, or instrumental to, the manifestations of mind, may or may not be the case. We have no proof of a conclusive nature, either one way or another; although various circumstances and considerations, not amounting to evidence, have induced several writers to suppose that these parts are actually more especially subservient to the mental powers. Yet, that two or three convolutions, or two and a half, or one and a half, or half or three fourths of one only, should be devoted to one faculty or propensity, whilst the next convolution, or those severally surrounding the portion thus devoted, and even the fractional parts of convolutions not belonging to that portion, should be very differently, or even oppositely, employed, the ultimate arrangement of structure being the same in all, is certainly, if not the extreme flight of imagination, at least the highest

---

* The author, before he was much known as a writer, had his head examined by several of the most eminent phrenologists of the metropolis, but there was no near agreement between any two of them as to his disposition.

pitch of hypothetical conclusion. Numerous other arguments may be adduced against this assumption; but they seem quite superfluous.

350. *f.* That the protuberance of the cranium marks, and is proportionate to, the developement or size of the particular organ of the brain underneath, often obtains, but not universally, or even generally. But this concession in no way supports the general doctrine, — even although the protuberance of the cranium truly and constantly expressed the volume, or rather prominence, of the part of the brain underneath. However, this correspondence very often does not exist, even in early life, for reasons that will suggest themselves to every anatomist. We find, moreover, and not infrequently, that there are prominences in the cranium, where there are underneath no corresponding developement of brain; and that the skull is impressed internally by irregular enlargements of the convolutions of the brain, and yet no external projection can be observed, corresponding with the concavities in the internal surface. But the phrenologists contend, as we have seen, that the size of an organ is in proportion to the strength of the faculty; and further, that a faculty, not naturally very strong, may be greatly strengthened by education or habitual exercise, even at advanced periods of life. Now, it may be asked, Is it to be expected that, at adult or advanced age, as the faculty gained strength, and as the organ, as they suppose, becomes increased in volume, the portion of cranium placed over it, will be protruded before it, so as to indicate the amount of increase? None but phrenologists could even dream of such a change as this in the skull at these periods of life. Here, however, they may shelter themselves behind activity, instead of bulk, or, if they still stick to the latter, and it evidently appearing that the bone does not yield to the growth of the subjacent organ, either the organ itself, or those around it, must be damaged by the consequent pressure — those in the vicinity must be atrophied, in proportion to the hypertrophy of the exercised part, and their functions injured accordingly, or even altogether annihilated.

351. *g.* It is evident, that the proposition directly based on the foregoing, — namely, that the strength of the faculties may be estimated by an examination of the projections and depressions of the skull, — requires no further remark. That faculties and propensities may be developed or restrained by education, is, and has long been, admitted, within certain limits. That the faculties acquire facility of action from exercise, provided that the exercise be neither excessive nor too long protracted, has been generally allowed. The passions and propensities also acquire strength from indulgence: but this is not regularly or universally the case; for, as remarked by Dr. Pring, a passion, which, in the earlier periods of its gratification, was vehement, might give place, after continued indulgence, to an apathy with respect to the same objects; and, in other instances, the excessive indulgence of almost any passion or propensity may terminate in disorder of it, or even in its imbecility, or total extinction. That the predominance of one passion or faculty may be restrained by the cultivation of another, is an old observation, which is not so universally correct as generally supposed, but which is received as an established axiom by the phrenologists, as it agrees with the belief in the distinctness of the individual mental functions, and of their respective organs. As respects the passions, we generally observe, that when certain feelings are frequently called into action, those which repress them, or are incompatible with them, are inactive, and less disposed to manifest themselves. This, however, does not extend to the purely intellectual powers; for, as regards them, we do not find that the cultivation of one power enfeebles the others; it merely tends to the formation of opinions unfavourable to the employment of another power. All that our existing knowledge permits us to advance on this topic is, *that certain modes or states of conscious sensibility or mind, being called into existence and action by their respectively related internal or external causes or occasions, these states continue to manifest themselves with an activity, generally corresponding with the intensity, character, repetition, and duration of these causes; and that a disposition thus to manifest themselves exists in proportion as they have been called into action, or thus exercised; other states of mind becoming inactive from the absence or insufficiency of those causes or occasions which are especially related to them, but assuming activity whenever these causes come into operation.*

352. This proposition is equally applicable to the intellectual faculties, and to the propensities or passions — to imagination, and comparison, and reasoning — to the benevolent and to the malevolent emotions; and is aptly illustrated by Dr. Pring, who remarks, that a disposition to cruelty may be repressed for many years, by a cultivation of the sentiments of benevolence, &c.: these sentiments may prevail until the age of thirty, when, from injurious treatment, or unfavourable observations of human nature, it may be suggested, that mankind are altogether unworthy objects; that they merit hatred rather than love; that, instead of the kinder offices, no species of cruelty is too bad for them. The original propensity would then be resumed, perhaps, even in greater force, from the contrasted sentiments which had been previously entertained, or from having been so long repressed.

353. *h.* It is obvious that, before the seats or organs of the faculties and propensities can be respectively assigned in the brain, it must be shown — *first*, that these faculties are severally distinct; and, *secondly*, that each occupies an appropriate and equally distinct portion of the brain. These propositions, however, have been already examined, and rejected for want of proof. Notwithstanding this, the phrenologists assert, that those persons who have certain faculties and propensities in a high degree, have certain protuberances on the skull, by which these faculties are denoted, — these protuberances being the external signs of the cerebral organs, and of their respective offices; and they support this assertion by the formation of the crania of those who had certain faculties and propensities in an unusual degree — these crania, as they aver, all having a protuberance for the same faculty in the same part or situation. But this practical application of their doctrine, upon the truth of which its utility entirely depends, altogether rests upon the facts which have been adduced in support of the proposition that the same faculties are always indicated by the same external signs, in respect of situation and developement. The number and correspondence of the facts, however, are denied by those who do not believe in

phrenology. It is obvious to those who think, that all physiognomical systems — that all attempts to establish a doctrine, by which the character shall be known from the external appearances of even a part, or of the body generally—may be supported, however *bizarre*, by a certain number of coincidences, which may be viewed as facts proving its truth. When we take into account the number of the mental affections and faculties, the diversity of intellectual and moral character, and the endless varieties of form of the head, face, and body, and of their expressions, it must be obvious, that any theory in which there is a reference of faculty to form, will necessarily find support in a large number of coincidences, — it cannot possibly be otherwise; and, if these coincidences be assiduously sought after, recorded, and marshalled as proofs of its truth, to the neglect of facts which disprove the connection attempted to be established, the theory will appear to many, and especially to those who are seldom at the trouble to think for themselves, a most brilliant discovery, — and the more so, that it promises an almost intuitive knowledge of character, and the most useful practical application. It is not denied, that some skulls present, in connection, — but, as far as the thing is yet proved, only in coincident connection,—certain propensities and faculties with certain external signs; nevertheless, it is confidently averred, that others evince no such correspondence between the mental character and the external form, and even contradict it in all, or in the most remarkable, of their respective parts. In the alternative, however, of activity, the cranioscopists have a refuge from adverse facts — and, as I have already hinted, from sound argument; and behind this, and various circumstances, — as controlling, deficient, inactive, and concurring organs, — they endeavour to intrench themselves. There are numerous other circumstances and considerations which strongly militate against the doctrine of GALL; but the scope of this work will not permit me to adduce them. The reader will find this topic more fully treated of in the able work of Dr. PRING already referred to.

354. *i.* The applications of cranioscopy to the pathology and treatment of mental derangement that have been made by those who believe in it, cannot be entertained; for, as it appears, from the reasons assigned above, and from others that might be adduced, not to be based in truth, such applications of it can only mislead, or interfere with juster views, or even be productive of irreparable mischief.

355. Having thus disposed of a doctrine which has received very considerable support, and which has been viewed by those who entertain it, as being of the greatest utility in understanding and managing mental disorders; although, even if most firmly based in truth, the utility of it in this respect is neither so great nor so obvious as they would wish it to appear; it further remains, briefly to consider the probable nature of the connection of the mind with the brain and nervous system.

356. iii. OF THE CONNECTION OF THE MIND AND NERVOUS SYSTEM.— *A.* Those who have reasoned against the possibility of the existence of the mind separately from the body, have referred to the general agreement of the state of the former with that of the latter, and to the effects produced in the manifestations of mind by disease and injuries of the brain, as proofs of the truth of their doctrine. But the inferences drawn from these two classes of facts, as Dr. PRING justly observes, are by no means legitimate. As to the first class of facts, showing a correspondence of vigour, at different periods of life, between the mental powers and the corporeal functions, it may be remarked, that the changes in these severally, although to some extent simultaneous, are not so universally, nor always in corresponding degrees: the faculties of the mind are sometimes unimpaired at far advanced periods of life, and the brain is fully developed long before the mental powers are in full vigour. Admitting, even, that the progress of the mind from infancy to old age is in general agreement with corporeal developement and strength, yet it does not *on this account* follow, that the changes of the mind, in the course of age, are *dependent* upon those of organisation. There may be a simultaneous developement without a necessary dependence. Besides, if the mental powers are entirely owing to the brain, — are merely functions of this organ, — wherefore are they not displayed at an equally early period of life with those of the liver, stomach, and other organs, — all of which manifest a perfection of function, either soon after birth, or, at least, long before the mental powers are fully developed? According to the doctrine of organism, no answer to this question can be given; whilst those who believe that, in the present state of our knowledge, it appears impossible for matter to give rise, of itself, to life or mind, and that a principle of vitality is necessary to the attraction of material or inorganised molecules into specific organised forms, and to be allied and associated with them for the purpose of enabling them to discharge appropriate functions, will readily respond, that in the early part of their existence, the brain and nervous system are the instruments chiefly, under the dominion of life and mind, of sensation, and of the instinctive feelings and emotions; and that, as fast as the mind is stored with the reports of the senses, — as fast as conscious sensibility is called into action, so as to form perceptions, and to perfect the results of sensation, — so it becomes also capable of retaining and comparing the objects of its consciousness, of reasoning and reflecting upon them, of suggesting new forms or combinations of them, and of drawing inferences from various sentiments or feelings arising out of the internal and external causes or occasions which influence or excite it.

357. The class of facts, consisting of modifications or suspensions of the mental powers, from organic lesions, and injuries of the brain, has been considered, by the supporters of organism, as conclusive proofs that the mind is a function merely of this organ, that can exist no longer when the fabric of it is destroyed. But it by no means follows, that, because those powers are destroyed by disease of the brain, they are, therefore, the product of the organisation of this organ. All we know is, that a certain degree of soundness of the latter is usually necessary to mental sanity; and that the mind shall be, in one case, severely disturbed by a slight change of structure; in a second case, but slightly disordered by most extensive disorganisation; in a third, unaffected by very remarkable lesions; and, in a fourth, most violently affected, without any appreciable alteration. Here, although the facts contended for are numerous, yet they neither correspond with one another, nor do

the lesions produce corresponding or co-ordinate effects on the mind; nor are the modifications of mind always to be referred to morbid conditions of the brain, — the results are neither uniform, nor correspondent, nor universal, — and hence the intimate dependence of mind upon the brain is not a legitimate inference from this class of assumed facts. The dependence of one thing upon another, it should be recollected, may be of different kinds: — 1st, It may be that of absolute cause and effect, — the latter existing only in consequence of the former, and ceasing with it; — 2d, The dependence may be one of association or connection, — in which state the one cannot be manifested without the other, and any disturbance of either will have a reciprocative influence. The dependence may be either of the foregoing kinds, and be greatly affected by the contingent interference of a third, or foreign influence, not requisite to the existence of either, and especially of that which suffers a change from such interference. Whilst it is the first of these that is contended for by many, the second appears to be the kind of dependence that naturally subsists between the mind and the brain; the contingent interference of morbid action in the brain disturbing the states of the mind, and the structural conditions of the brain itself.

358. The exercise of the faculties of the mind is dependent upon a cause which is allied with, or which actuates, the brain, and is modified or suspended in consequence of disease or injury of the brain, not because the integrity of this organ *produced* these faculties, but because the exercise of them is prevented by the foreign influence of a preternatural state of the organ with which they are allied. On this topic, Dr. Pring justly remarks, that in the case of disease or injury of the brain, followed by suspension of the functions of the mind, we do not know the agents or the mode by which such suspension is produced. We perceive a change in the condition of the structure; but whether the action of the mind ceases, because a material arrangement is disturbed, upon the precise state of which the action of the mind depended, as upon an essential cause; or whether this action ceases, because it is impeded by the foreign or preternatural influence of a fabric with which it is allied; we are precluded the discrimination of experience. Yet the alternatives have this important difference, — that, in the former case, the mind cannot exist without a precise arrangement of a material structure; in the latter, it may exist independently of such organisation; and, although liable to be disturbed or suspended by change of organisation, in the same manner as any other effect may cease under a foreign influence, yet its exercise may be resumed, when this influence is withdrawn.

359. The dependence of the mind upon the ganisation of the brain is said to be most unequivocally shown by the effects of *compression* of the organ; but compression, like organic lesions, may impair or suspend the manifestations of mind, whether they are a result of a certain state of organisation, or whether they are only allied or associated with it. In the former case, the effect is one of necessary dependence upon its cause, — the function ceasing upon a certain preternatural condition of the organ; in the latter, the foreign interference disturbs or suspends the condition of the material fabric with which mind is associated, and as soon as this interference and its material consequences are removed, the manifestations of mind are restored more or less completely, according as the removal of the foreign cause of disturbance is complete.

360. It follows, from what has been advanced above, that disorder or suspension of the manifestations of mind, from disease or injury of the brain, is no proof that the mind is necessarily a *function*, or an effect or product of this organ; but merely that the brain is the organ, instrument, or medium of communication between the mind and the external world.

361. In favour of the belief that the mind is independent of the material fabric with which it is intimately allied or associated, or is a result of vital properties superadded to, and actuating, this fabric, numerous considerations and satisfactory evidence, if my limits could permit, might be adduced; but it may be remarked, — 1st, That the circumstance of the opposite doctrine, or that of organism, having been found fallacious and untenable, the only other doctrine, by means of which the phenomena of mind and organisation can be explained, appears the more entitled to credit; — 2d, That mind ceases to be manifested in consequence of an organic lesion in a particular or limited part of the brain: if the mind were the result of the organisation, there is no reason why it should not still be produced, wherever the organisation is perfect; — 3d, That the principle or properties of life, endowing living animals from conception to death, and the structures which life endows and actuates, are undergoing a perpetual change, and, as existence advances, a perpetual consumption, without any loss of identity; that both the original vital endowment, and its associated structures, are perpetuated from inorganic or from broken down vegetable or animal substances, as from their elementary sources, — these substances containing the constituent properties or elements of life and of structure; that this conversion and appropriation of the elements of life and structure are performed by the changes produced in, and by the affinity or attraction exerted on, these elements contained in dead or inorganic substances, by life; and that this attraction is one of assimilation, by which a living principle separates, adopts and unites its own properties or elements, and those of its allied structures, from the various materials furnishing them, thereby perpetuating their forms, as long as their own identity or existence is preserved, and as long as their elements are submitted to the influence, or brought within the sphere, of the vital endowment, or principle, which alone is capable of thus acting; — 4th, That it is observed of *functions* generally, that they are the results of life in conjunction with structure — of organisation built up and actuated by the vital principle endowing it; that the function of every organ is dependent upon the continuance of its life; that it is not produced by the organisation, — for the material elements composing the individual tissues and the general organisation are held together in a state of affinity or attraction and cohesion opposed to that which their chemical affinities dispose them to assume; that this predominant affinity and cohesion are owing to a vital endowment, and are therefore aptly denominated vital; and

that, whilst it thus holds the material elements in a due state of attraction, appropriately to the constitution of the several tissues, it also enables them to discharge specific or peculiar offices or functions; — 5th, That, this dependence of function upon vitality existing throughout the body, a similar dependence of function upon vital endowment may reasonably be extended to the brain; — and, 6th, That the evidence we possess as to life being the cause of the organisation of material elements, and of its own perpetuation or renewal, as well as that of its allied structures; and as to its being a principle superadded to, intimately allied with, and actuating, a material fabric, and of which evidence such notice as the scope of this work will permit has been taken above (§ 336. *et seq.*), and in the article DISEASE (§ 2. *et seq.*), is sufficient to show, that the mind is the result of the vital endowment of the brain, without which endowment this organ would not only cease to be the instrument of mental manifestation, but would also fall into dissolution; its material elements, no longer being held together by the attraction of life, assuming those forms to which they are chemically disposed. According to this view, the evidence in favour of the immateriality of mind is the same as that upon which the doctrine of vitality, or the primary agency and controlling influence of life upon structural arrangement or organisation, and upon function, is based; and mind thus appears the highest manifestation or property of life, in connection with, and through the instrumentality of, the brain — that particular congeries of tissues, in alliance with which only could its wonderful faculties become apparent.

362. Matter is known to us only by our senses; mind, by our consciousness. We know quite as little about the essence and occult qualities of mind, as we know of matter; and, as far as our most profound conceptions of them can carry us, we have no ground for believing that they have any thing in common, beyond their derivation from parents, and the support or renovation they derive from surrounding media and materials furnishing the properties and elements of their developement, perfection, and perpetuation. The principle which thinks, as Dr. ABERCROMBIE remarks, is known to us only by thinking; and the substances which are solid and extended, are known to us only by their solidity and extension. When we say of the former, that it is immaterial, we simply express the fact, that it is known to us by properties altogether distinct from the properties to which we have given the name of matter, and, with the exceptions just adduced, has nothing in common with them. Beyond these properties, we know as little about matter as we do about mind; so that materialism is hardly less extravagant than would be the attempt to explain any phenomenon, by referring it to some other altogether distinct and dissimilar, — to say, for example, that colour is a modification of sound; or gravity a species of fermentation.

363. We have, in truth, the same kind of evidence for the existence of mind, that we have for the existence of matter, — namely, that furnished by its properties; and of the two, the former appears to be the least liable to deception. Of all the truths we know, says Mr. STEWART, the existence of mind is the most certain. Even the system of BERKELEY, concerning the non-existence of matter, is far more conceivable than that nothing but matter exists in the universe. To what function of matter can that principle be likened, by which we love and fear, are excited by enthusiasm, elevated by hope, or sunk in despair? These and other mental changes may be equally independent of impressions from without, and of the condition of the bodily frame. In the most quiet state of every corporeal function, passion, remorse, or anguish may rage within; and while the body is racked by the most distressing maladies, the mind may repose in tranquillity. The mind thus being so frequently uninfluenced by the state of the bodily organs, and so dissimilar and distinct from the functions of these organs, what reason have we to believe that it is dependent upon organisation, further than in being intimately allied with it, for the purposes of intercourse with the external world. When these purposes are fulfilled, this alliance is divorced; and as *mind*, the highest grade of vital endowment, is insusceptible of decay, although liable to be variously disturbed by diseases of its allied fabric, the connection ceases generally, in consequence of the state of this fabric having become incompatible with its manifestation. As soon as the *organic life*, or lower grade of vital endowment, or the properties of life actuating the organs of digestion, assimilation, circulation, respiration, and nutrition, and giving rise to functions subservient to the display of mind, by means of the brain and nervous system, cease to be exerted on their respective organs, the vital cohesion of all the structures ceases, and changes take place in the arrangement of their constituent elements. These structures, however, are not annihilated, their elements have only changed their forms; thereby furnishing an analogical proof, as remarked by Dr. BROWN, of the continued existence of the mind or thinking principle, — that it survives the disorganisation and changes experienced by its allied fabric, by means of which its properties or powers are displayed, and the various relations subsisting between it and the rest of the creation are established and preserved.

364. *B.* If we endeavour to inquire into *the origin of mind*, all the information which our faculties enable us to obtain, amounts merely to the following; — that, in common with the other properties of life of which the structures are possessed, it is derived from parents; is developed by the changes in the constituents of the ovum; is matured by the processes of growth; is allied with an appropriate organisation, or material fabric; and, like the other vital properties, subsequently manifests the phenomena which result from its own nature, and the agency of related causes. It is alone sufficient to establish, as Dr. PRING well remarks, the derivation of the mind from parents; that the being who exhibits the possession of it, is a production from parents; that he is so endowed by an internal conformation, the materials of which are obviously from parental sources; and that he is not cotemporary with parents, but is a production peculiar to a more or less advanced and perfect period of their existence. The peculiar features also of the mind of the offspring are often found to resemble conspicuous ones which belonged to the parents; or, like the hereditary peculiarities remarked in the structures, the mental characteristics of parents are not manifested in the succeeding generation, but remain latent, and

are displayed by the one which follows. Thus, insanity is as conspicuously transmitted from the parents to the offspring, as any one of the hereditary corporeal diseases. The association, however much or little, with the good or with the bad, with the well-informed or with the vulgar; the being familiarised with scenes or sentiments which captivate the imagination, or with topics which exercise the reason; or confinement to a sphere in which the mental impressions and exercises are little more varied than those of a horse in a mill, — will individually have an effect upon the character of the mind, and will concur, with previous relations of growth, to disguise its resemblance to the original from whence it proceeded.

365. From these and various other considerations, it may be inferred, that the embryo derives its vital properties from both parents, — those of either parent somewhat predominating in certain cases, and as respects certain properties; that these properties vary in grade, in different classes of animals, the highest of which furnish incontestible proofs of the possession of several of those faculties which we attribute to mind; and that the same grade of vital properties is communicated to the embryo as characterise the parents,—these properties developing, in the embryo, the material fabrics, or structural arrangements, about to become the instruments or media of their manifestation; mind, and especially the powers of association and reflection, being the highest grades of these properties, and requiring a more complete developement of the brain for their display.

366. C. If then the conclusion, that the mind is not a mere result of structural arrangement, is deducible from satisfactory evidence, it remains to inquire still further, *for the relation subsisting between the mind and the material fabric with which it is associated*. A perfect account of this relation is most probably beyond the reach of our faculties; but amongst various other topics it comprises much of what has already been alluded to, as well as a statement — 1st, of the circumstances upon which the existence of a mind or intellectual principle depends; 2dly, of the mode of its connection with the material fabric; — and, 3dly, of the mode by which changes or conditions of the mind, and of the organisation, affect each other: but to these topics I can only briefly and imperfectly allude.

367. *a.* Most of the circumstances upon which the existence of mind depends have been noticed, as far as they are known to us. It has been shown above that the powers of mind are the highest properties of life evinced through the medium of a perfect nervous system; that these powers, with the other properties of life, are derived from parents; that they are developed during the early stages of existence; that they become known to us only through the instrumentality or medium of a cerebro-spinal nervous system, actuated by the vital endowment of the frame; that the phenomena of mind are produced chiefly by relations subsisting between it and external objects, — by sensations transmitted to the brain and there disposed of, according to their relations with the other properties or powers constituting the intellectual principle or mind, and partly also by its powers of suggestion, abstraction, comparison, and reflection; and that the connection of mind with its material fabric is one of alliance, and not of necessary dependence, or of dependence only as far as the structure may be required as a medium between the mind and external objects, or may concur to its support or phenomena.

368. *b.* The *bond* or *connection* subsisting between mind and organisation can be viewed only as one of affinity or *alliance;* and the sole reason we can assign for this connection is, that it is a law of nature. We have seen, that this alliance is of such a kind as that the *existence* of mind is not necessarily dependent upon the material fabric; but that we are rather entitled to consider the organisation to be dependent upon life, mind being those manifestations of life evinced by the cerebro-spinal nervous structures, and resulting from the vital endowment actuating these structures; for it is impossible to conceive that an organised body could have come into existence without a vital or animating principle; and it is equally impossible to conceive how an animating principle, and more especially its higher properties or powers, — the faculties of mind, — could have been manifested or duly exerted, unless in most intimate alliance with matter, the molecules of which it could so build up and actuate as to render them the media and instruments of communication with the other materials constituting the visible world. When, however, the molecules of matter are thus built up, variously formed, and actuated, they are incapable of perpetuation, in their numerous and wonderful states, or even of more than a momentary existence, unless in alliance with, and endowed by, life — by that life which organised the molecules of matter, developing and perfecting them in their respective forms and grades of being. As soon as the alliance of life and organisation is divorced, the former escapes the cognisance of our senses, our unaided reason being incapable of acquainting us with its subsequent states of alliance or existence, and the latter returns to its elementary states. Thus we perceive, that organisation, with all its phenomena, is dependent upon life from its commencement to its termination, — its commencement resulting from the vital endowment bestowed at first by parents, and perpetuated afterwards by assimilation; its termination, ultimately, being consequent upon the loss or departure of this endowment, without which it can no longer exist. But, whilst organisation, with all its functions, is the result of, and is necessarily dependent upon, a vital endowment, in all its grades and manifestations, this endowment is not necessarily dependent upon organization, although associated with it in such a manner as fully and duly to actuate it; and this latter conclusion is supported by the reasons assigned above (§ 356.), as well as by the consideration that life, in all its grades, may exist independently of the material fabric which it actuates, although placed beyond the spheres of our senses. This is not above the range of conception or of probable existence, but admits of belief equally with other remote causes of visible phenomena; whereas the dependence of life and of its highest manifestations, or mind, upon organisation is incompatible with our experience of the numerous objects composing the external world, with our conceptions of possible phenomena, and with their causation, perpetuation, and termination.

369. *c.* The *mode* in which changes of the mind and of the organisation affect each other

can be only obscurely or imperfectly recognised; but, still, enough is manifested, to show—1st, That changes in the manifestation of the mind affect the organisation by primarily disturbing the functions of life in organs intimately related to the nervous system; —and, 2dly, That changes in the organisation affect the mind, in consequence either of the molecular arrangement of the material fabric, necessary to the healthy state of mind, being disturbed, or of the affinity or alliance existing between this fabric and its vital endowment being weakened or deranged, or of disorder of this endowment occasioned by the changes of its associated material fabric,—these changes deranging the manifestations of life usually evinced by the brain. Each of these propositions require further remarks.

370. 1st. In illustration of the influence of the mind upon the organisation, it may be stated that the depressing passions impair the functions of digestion, and weaken the action of the heart; and, if these effects are intense or prolonged, the organisation not only of the digestive and circulating viscera, but also of the brain, becomes affected through the medium of the nervous and circulating system. Here we perceive that changes in the functions of an organ affect both that organ itself, and also other organs related to it, by means of nervous and vascular connections.

371. 2d. If the structure of the brain be changed, the consequences are not uniform, either as to extent or character: there may result disorder—1st, of the mind; or, 2dly, of connected or related functions; or, 3dly, of both mind and related functions. Yet these consequences are not necessary or absolute, they are merely contingent—they are not constant or uniform, but uncertain and frequent: for numerous facts prove that the fabric of the brain may be most palpably and variously changed, without the mind being appreciably disordered; and that the most severe mental disturbance may suddenly occur, and as suddenly disappear, where no lesion of the organisation of the brain can be detected, or even inferred. These facts lead to the conclusions—1st, That changes in the mind, or vital manifestations of the brain, do not result uniformly, or even generally, from a disturbance of the molecular arrangement of this organ;—and, 2dly, That changes in the mind depend either upon impairment or other derangement of the affinity or alliance subsisting between the fabric of this organ and its vital endowment, or upon alterations in the state of this endowment, whether occasioned by lesions of its associated structures, or occurring independently of such lesions. To either, or both, of these alterations, disordered states of mind may be imputed; and either of them will explain the fact that these states of disorder proceed in some cases from alterations of structure, and in others without any appreciable alteration. They both—especially the latter—explain those sympathetic states of mental disorder which are of so frequent occurrence. Thus, the organisation, or even the function, of a remote organ is seriously disturbed, and the vital manifestations of the brain, or the mental powers, suddenly become more or less disordered, and as suddenly are restored to their healthy state. There is, however, no reason to conclude, that the material fabric of the brain is altered in such cases. All that we are entitled to infer is, that the change in the primarily affected organ has so disturbed the vital endowment of the frame, as to disorder in a special manner the manifestations of this endowment in the brain and nervous system; or, in other words, so as to derange the states of mind, or the various conditions of conscious sensibility, in relation to its internal and external causes.—From the preceding observations, and from numerous facts and considerations which my limits would not admit of being adduced, I may state the following inferences, as possessing more or less of practical importance, especially with reference to mental disorders; although their practical bearings may not be very obvious to the empirical or routine practitioner.

372. (1.) An organised being did not organise itself; the creature did not create itself, but was created; and all we know with precision, especially in respect of the origin of the more perfect animals, is, that they have proceeded from parents or anterior living existences.

373. (2.) Our present knowledge warrants the conclusion, that the derivation of organised bodies from parents depends upon certain material elements which proceed from both parents, and which are endowed, or associated, with a vital emanation from these parents,—the combination or mutual influence of these elements and of their vital endowment producing the new animal; and that the material elements furnished by the parents toward the production of their offspring, and vitally endowed by them, are of such a nature as to admit of conversion, under the influence of life, into those tissues more immediately required in the early stages of developement, and of separate existence, of the offspring.

374. (3.) Every consideration of the subject confirms this inference,—that not only does a vital emanation proceed from each of the parents, in connection with the material elements furnished by them towards the formation of the new animal; but also, that this emanation, or vital endowment, is possessed of properties, although in a latent or non-manifested state, similar to those possessed by the parent which furnished it; and that the vital emanations or endowments proceeding from parental sources, combine in producing the new animal, and form and develope the material elements with which they are allied or associated.

375. (4.) There is every reason to infer, that the embryo derived from these sources requires to be furnished, for a time, with those elements of assimilation necessary to its developement, and to its future state of independent existence; and that such assimilation and developement are accomplished by means of the vital endowments derived by both parents, although reinforced or promoted, or at least favoured, by the circumstances in which the embryo is placed in respect of one of its parents.

376. (5.) The animal, being thus organised by means of vital endowments derived from these sources, is afterwards supported by these endowments; the offices performed by each and every part of its frame, whether tending to the continuance of its existence, to the perpetuation of its species, or to communication with objects external to, and remote from, it, depending upon these endowments being weakened as they become impaired, or disordered as they are disordered, and ultimately ceasing immediately when they disappear or depart from the body which they thus preserved and actuated.

377. (6.) An organised body thus vitally endowed, presents an assemblage of organs, each of which performs, whilst actuated by life, certain offices or functions; their tendency or purposes being—1st, to continue the existence of the animal, by assimilation of the elements of matter external to itself; — 2dly, to perpetuate the species;— and, 3dly, to hold relations, more or less extensive, with the physical, and, in man, also with the moral or social, world. These organs or viscera are respectively endowed with life, which is either intimately associated with a general system or tissue, supplying all organs and parts of the frame, or is more generally diffused to all the structures, and even partially also to the circulating fluids; and they manifest this endowment in various modes, according to their organisation; their offices or functions being performed under the influence of life, and only by means of its influence, but through the instrumentality of the organisation. The functions of a living animal being thus altogether or entirely dependent upon life, these functions may be viewed as the manifestations or properties of life through the intervention or medium of the structures. Thus, irritability is a manifestation or property of life by means of the muscular system, and the various modes of sensibility are manifestations or properties of it evinced by a cerebro-spinal nervous system.

378. (7.) Conscious sensibility, in all its forms, and the intellectual and moral states, in all their varieties, arising from the relations of consciousness with its numerous external and internal occasions, are the highest properties or manifestations of life through the instrumentality of the brain—perfected, however, or called into existence or activity, by sensation, education, and reflection. These manifestations of vital endowment by means of a perfect nervous system, are the properties, powers, or faculties of mind, which are known to us only in alliance with this system.

379. (8.) The powers of mind, being, then, the highest properties and manifestations of life, through the medium of a perfect nervous system, are dependent upon the vital endowment of the frame, or result from this endowment whilst actuating its allied material fabric; the states of conscious sensibility, or of the mental principle, depending as much upon it as upon changes in the organisation of the brain itself. The faculties of mind are, therefore, manifestations of the vital endowment, through the instrumentality and medium of the encephalon: this endowment, in actuating this particular part of the fabric of the body, evincing these faculties, or mental phenomena. In this process, it is obvious that the particular conditions of the general vitality, whether as to power, or character, or quality, must influence the results, or the manifestations of mind, independently of any change, of an obvious or appreciable nature, in the fabric of the brain; and that disorders of mental manifestation will proceed as much from the conditions of the general vital endowment, as from alterations of the structure of the organ.

380. (9.) It having been shown above, that the vitality of the frame, as it endows and actuates the brain, is not necessarily dependent upon, but is merely allied or associated with, the brain, it follows, that changes of the structure of this organ may or may not affect the mental powers, so long as they are not of such a nature as to seriously disorder the vitality of the frame; and that, when the mental faculties are deranged in consequence of alterations in the fabric of the brain, the disorder is owing to the disturbance which such alterations produce in either the general or the local vital endowment, or both; the local lesion affecting either the general vitality, or that part of it endowing the encephalon more particularly, or both, contingently and frequently, but not necessarily or uniformly.

381. (10.) The alliance of the vital endowment with the material fabric being intimate, it may be inferred that affections of the one will disorder and ultimately change the other, when intense or prolonged—although in persons possessed of robust frames, and much vital energy, the disorder of either may be severe, without its associate being seriously changed. Intense affections of mind hence may, or may not, change the allied fabric, and *vice versâ*, according to the susceptibility of the system, and various other concurrent circumstances. This being the case, much of the structural lesion observed in old cases of mental disease, is as probably the result, as the cause, of such disease; the prolonged disorder of the vital endowment of the brain ultimately modifying the organisation of that structure or fabric which was the instrument or medium of the disordered manifestation. In such cases the mental affection will influence the general as well as the local vital endowment, although it is primarily merely a disordered state of that endowment, either generally or locally, and react upon it to such an extent as ultimately to change the allied fabric either of the brain or of remote organs.

382. (11.) As the powers of mind are manifested only through the medium of the encephalon, and are not the products of its organisation, — as they are the higher properties or manifestations of life only in alliance with, and through the instrumentality of, this organ, — and as affections of the vital endowment, or disorders of these manifestations, and changes of the intimate fabric of the encephalon, only contingently and frequently, but not necessarily or generally, disorder each other,— so it follows, that the amount of the disorder evinced by the mental power is no index to the extent or nature of the change existing in the brain, nor even a proof of the existence of any such change; and further, that the extent of change in the encephalon produces no correlative disorder of the mental powers; and that most extensive lesion may be present in the former, without the latter being materially, or even at all, disordered.

383. (12.) Although lesions of the brain are often evinced by disorder of the mental powers, they are more generally and certainly indicated by the physical disorder, or by phenomena displayed by distant, but related, parts. When lesions of the brain exist in connection with disorders of the mind, these lesions in respect both of their nature and extent, are indicated rather by the physical than by the mental phenomena; the states of the general vital power, or endowment, being kept in view.

384. (13.) Disorder of the vital manifestations of the brain being as dependent upon the states of the general and local vital endowment, as upon alterations of the fabric of the encephalon, or even more so, it follows, that the states of this endow-

ment, generally and locally, and in connection with changes of structure in various or remote, but related, parts, should form the bases of our pathology of mental disorders, as much as lesions of the fabric of the encephalon; and ought, moreover, to be the grounds and guides, as much as they, of our therapeutical indications, and the guides of our intentions and means of cure, whether hygeienic, moral, or strictly medical.

385. VIII. TREATMENT OF INSANITY.—There are few maladies which are more successfully treated than insanity, when the means of cure are promptly employed, and appropriately to the varying forms and features of individual cases; and there is none which requires, in order that all possible success should be obtained, a more comprehensive knowledge of morbid actions, of the disorders not only of the brain but also of the other viscera, and of the intellectual and moral manifestations, as variously modified, influenced, or disordered, by the predominant feelings, the manners, the prejudices, the dissipations, and the vices of society. In attempting to give a full exposition of the treatment of mental disorders, as far as the existing state of our knowledge will enable me, it will be necessary — *first*, to offer some observations generally applicable to the treatment of insanity; — *secondly*, to state the means which seem most appropriate to the different forms of the malady; — *thirdly*, to estimate the value of the principal remedies, in the several states of derangement;—and, *fourthly*, to consider the moral management of the insane.

386. i. REMARKS MORE GENERALLY APPLICABLE IN THE TREATMENT OF INSANITY. — It was formerly too much the practice to treat the insane according to a certain routine or system, without reference either to the causes, or to the form, of the malady; and the routine or system followed was generally based upon some prevalent doctrine applied to it, or some generally adopted system of pathology. Thus, the Ancients had recourse to drastic purgatives, and especially to hellebore; the discovery of the circulation of the blood led to the employment of sanguineous depletions; and the general adoption of the humoral pathology, at a still more recent period, was followed by a revival of the use of purgatives in this class of disorders. It must be obvious, however, to all who have observed the very different forms, the varying phases, and the numerous complications of these disorders, — who have viewed them in connection with their causes, and with their effects upon the organisation,— that they, of all maladies, require not only the most diversified, but also the most opposite means, according to the different *causes* and *kinds* of disorder, and to the changes observed in particular cases.

387. Each case of mental disorder presents certain circumstances, all which require calm consideration, in order that it may be successfully treated. —1st. *The causes*, whether moral or physical, predisposing or exciting, should be viewed, in respect of their individual and combined operation, — of their action on the system generally, and on the brain, or any other organ particularly, — and whether acting primarily and immediately, or secondarily and sympathetically. — 2d. *The state* and *stage of morbid action* ought to be ascertained, as regards both the grade of action, generally and locally, and the influence which such action seems to exert upon the manifestations of mind; —and, 3d. *The condition of the organic functions*, not only as it may be the cause of general and local morbid action, but also as it may be the consequence of such action. — On these circumstances are based those indications of cure which should be proposed when entering upon the treatment of every case of mental disorder. — 1st. *The causes should be removed, in ways appropriate to their nature and combinations.* — 2d. *General or local morbid action ought to be moderated, controlled, or removed according to its nature — whether it be increased or excited, or imperfect, or deficient.* — 3d. *The several organic functions should be promoted, when impaired; and restrained, when inordinately excited, either individually or collectively.* It is unnecessary to state here, how these intentions are to be severally carried into effect. The method or plan of procedure must necessarily vary with the circumstances characterising the different forms of the malady, and the individual cases of these forms; but the remarks which I have to make may be referred to each of these indications, and in their respective order.

388. *A. The seclusion of the insane* is a question of the first and greatest importance, not merely as respects the removal of the causes of disorder, although this is one of the chief points in which it should be viewed, but also as regards the physical and moral treatment. That every person who is more or less disordered in mind should be separated from those with whom he has been accustomed to live, and from his family and friends, and restrained from his accustomed habits and manners, and confided to the care of strangers, in a place altogether new to him, may not be affirmed universally; but the exceptions to this rule are not numerous, and should be made, in practice, with care and discrimination. As to the propriety of this measure, the most experienced physicians in Great Britain, and in foreign countries, are agreed. M. ESQUIROL remarks that recoveries are comparatively more numerous amongst the patients who come to Paris to be treated, than among those who inhabit that capital; for the latter are less completely isolated than the former.

389. *a.* The first effect of this measure is to produce new sensations, to change or to break the series of morbid ideas of which an insane person cannot divest himself: unexpected impressions are made upon him, arrest and excite his attention, and render him more accessible to counsels which may restore his reason. Generally, as soon as he is thus secluded, he is surprised and disconcerted, and experiences a remission of the disorder, that is of the utmost consequence in the treatment of it, and in acquiring his confidence. The change is not the less useful, observes M. ESQUIROL, in combating the disorder of the moral affections of the insane. The disturbance of the nervous system renders the sensations morbid and often painful; their natural relations with the external world are no longer the same as in health; all things seem disordered or overturned. The patient cannot believe that the cause of these phenomena is in himself. He is persuaded that every one wishes to contradict and irritate him, because they disapprove of his excesses: not understanding what is said, he becomes impatient, and puts an unfavourable construction on what is addressed

to him. The most tender expressions are taken as offences, or for enigmas that he cannot comprehend. The most assiduous care is vexatious to him. The insane patient, having become timid or sullen, suspects every one who approaches him, and especially those who were dearest to him. The conviction that every one is inclined to torment, defame, and to ruin him, increases the moral disorder. With this symptomatic suspicion of those about him, — which generally increases, without any motive or cause, from inevitable circumstances or opposition, and with the change in the intellects, — to allow the patient to remain in the bosom of his family might soon be followed by the most disastrous consequences, not only to himself, but also to others.

390. Where the husband suspects the cares and assiduities of the wife; or the wife those of the husband; and supposes that he or she is in league with those who conspire against him; — where the lunatic believes that the members of his family are the slaves destined to obey his sovereign commands; or are the ministers or apostles of his mission; — where the cause of the mental disorder exists in the patient's own family, or arises from dissensions, chagrins, reverses of fortune, or privations; — where the insane person entertains an aversion, hatred, or dislike to any member of his domestic circle, and, particularly, to any one who had been most dear to him; — or where the parent, or the son, the lover, or the friend, is impressed with the sentiment of his incapability of fulfilling the duties which he conceives to be imposed upon him, — the necessity and advantages of removal, and complete separation, from the object of his aversion, of his anxieties, or of his fears, are especially obvious and indisputable. The dislike entertained by the insane to those who had once been most dear to them, without either cause or motive, imperatively demands the removal of the patient, who generally readily becomes calm before, or attaches himself to, an agreeable stranger, owing either to the circumstance of his presence being unattended by any unpleasant association or suggestion, or to a feeling of self-love which induces him to conceal his sentiments and his state, or to the novelty of the impressions produced by strange persons and objects. — Whilst these are the chief inconveniencies and difficulties in the way of the treatment of the insane whilst they remain in the bosom of their families, there are great advantages to be derived from removal to a place suitable to the management of this class of patients.

391. *b.* But how should the seclusion or the separation of the insane be carried into effect? That it should be effected by means of an asylum or institution devoted to their treatment, in the great majority of cases, is generally admitted; although removal to such a place may be unnecessary in some instances, or unadvisable in others, owing either to the character of the disorder, or to the peculiar position of the patient — to the circumstances connected with certain cases. *Partial seclusion* or separation may be resorted to in some cases, and especially in those which are slight. A partial separation is when the patient remains in his own house, and is separated either partially or altogether from the members of his family and his friends, and is placed in the care of one or more suitable persons. Seclusion is more complete when he is sent to travel, or to make a voyage, in the custody of proper persons, or of one or more of his relations or connections. And it is *complete,* when he is removed to a residence altogether new to him, and surrounded by strangers, to whose care he is committed. Of this last kind of separation, there are several modifications; the chief of which are — 1st, A private residence, devoted to the patient and to those placed in charge of him; — 2d, A private asylum, containing several or many inmates; — and, 3d, A public, or large institution destined to the reception of a great number. In the great majority of cases, the seclusion, in order that it may be fully successful, should be complete; and the last of these modes, when provided with all the appliances and advantages which many of these now possess, is the most useful, as it conjoins, with complete separation from the relations of the insane, several arrangements and circumstances obviously beneficial. M. ESQUIROL remarks that the patient should be removed to an institution devoted to the treatment of mental disorders, rather than to a private asylum or residence. Partial isolation is much less successful, than that more completely afforded in a well regulated institution. The chief objection which has been urged against the latter, is the association with a number of companions in misfortune: but this is not injurious, is no obstacle to recovery, but is even of service, inasmuch as it causes the patient to reflect upon his condition; and, as the objects around cease to impress him, he is amused or distracted by those about him, is occupied by the objects passing around him, and thereby abstracted from what is apt injuriously to engage his thoughts. Large institutions, moreover, present greater facilities for the protection of the maniacal and furious, without having recourse to injurious or irritating means of coercion and restraint; and the attendants are more experienced in their management, than in a private house of detention. The advantages, however, of treatment in institutions of this kind depend entirely upon the medical acquirements and the characters of those intrusted with their management; upon the nature and completeness of the arrangements, therapeutical, hygeienic, and moral; and upon the organisation and discipline of the whole establishment. Still, there are cases, to which removal to institutions or asylums for the insane is not applicable, however ably they may be managed, and their inmates treated; and, to these cases especially, removal thence might be productive of injury, particularly if the seclusion were not modified according to the susceptibility of the patient, to the character of the disorder, and conformably with the passions, the habits, the feelings, and the modes of living and manners of those subjected to it. It is not to be considered as a measure which should be universally employed. In this, as in all other departments of medical practice, experience — that is, close observation of phenomena, a knowledge of all matters related to individual cases, and a comprehensive view, and weighing of circumstances — will generally decide correctly as to its propriety.

392. Example, which has so great power over the opinions and actions of man, also influences the insane, who are often not deficient in sagacity and in the power of comprehending what is passing

around them. The recovery, or the departure of a patient, creates confidence in others, and a hope of recovery, and restoration to liberty. The convalescents, by their conduct, and advice, console and encourage those who suffer, and thus are of the greatest benefit; one class of inmates of such institutions acting beneficially on the other, and favouring the success of the treatment. The calm, also, enjoyed by all; the moral repose arising out of removal from the habits, the business, the perplexing cares, the domestic anxieties and chagrins, and the irritating contrarieties, to which they were previously exposed; the regular mode of living, the judicious discipline, and the regimen, to which they are subjected; and the necessity of duly comporting themselves—of conducting themselves with propriety before strangers, and before one another, — all tend to suggest rational reflections; and become powerful auxiliary means of recovery. The cares and attentions which the insane receive in their own families are counted as nothing; but the attentions paid them abroad, or by strangers, are appreciated, because they are novel, and are neither due nor exacted. Hence the control readily obtained by those to whose care they are committed, when they are kindly and judiciously treated.

393. *c.* For melancholic and various forms of partial or slight insanity, complete separation is sometimes unnecessary, or even injurious. Partial separation, travelling, and various modes of exerting moral control, according to the peculiarities of the case, are often best suited to these states of disorder. Mania, and several states of monomania, demand complete seclusion. Demency, imbecility, and idiotcy require more or less complete separation — at least from society. Complete seclusion is generally necessary to the poor lunatic; as he would otherwise be unprovided with the aid required to restore him to his family.

394. *d.* Separation and isolation act directly on the brain, — composing it to tranquillity, shutting out irritating impressions, repressing excitement, and moderating the exaltation of the passions and ideas. The sensations of the maniac are thereby reduced in number and intensity; and his attention arrested, and even fixed, by thus being reduced, by the novelty of those which are excited, and by their frequent repetition. The melancholic and monomaniac are torn away by it from their morbidly concentrated thoughts and ideas, and are directed to different objects or topics, — especially when proper means of distraction are had recourse to — when judicious moral management is conjoined with enlightened medical treatment.

395. *e.* In separating the insane from their families, the place of residence selected for them should be healthy, airy, and protected from cold winds, as well as from humidity and offensive exhalations. Their constitutions are generally more or less impaired and enfeebled, and they are consequently the more obnoxious to depressing influences and contaminating agents. They are generally predisposed to cutaneous eruptions, enlargements of the glands, and general cachexia; and they therefore require the more a dry and temperate, or even moderately warm, air. It is a grievous mistake to suppose that they are insensible to cold and atmospheric vicissitudes. Although they may not give expression to their sensations, their constitutions, and even the states of their minds, are remarkably affected by cold, humidity, and sudden changes of weather and season, — against which they should be completely protected.

396. *f.* The period at which the seclusion of the insane should terminate, is not easily determined. Experience of a diversity of cases and circumstances is the chief guide to a just conclusion. When this measure is found to be unavailing, after having been duly employed, the visits of near relations, friends, or former connections, may be tried; great discretion being used in the selection of those who are the first to be admitted to the patient. In such cases, the visit ought to be sudden and unexpected by him, in order that it may make the stronger impression. The utmost care should be taken in the admission of the visits of friends to convalescents; and, with them, suddenness and surprise should be guarded against. Upon the whole, it is preferable that seclusion should be prolonged, rather than that it should cease prematurely. This measure, moreover, ought not to be had recourse to in any state of delirium consequent upon, or symptomatic of, febrile diseases; and seldom in puerperal insanity.

397. *B.* To establish *the medical treatment* upon a sure basis, it is necessary to obtain as complete a knowledge as possible of the predisposing and exciting causes of the malady; to ascertain the physical as well as the moral sources and relations of it; to determine whether the physical occasions the moral, or the moral causes the physical, derangement; and to recognise the cases which will recover spontaneously upon separation or isolation and upon the removal of the causes, those which require chiefly judicious moral management, those which demand medical treatment, and those for which a combination of these means will be requisite. Regardless of these and various other important considerations, the medical treatment of the insane has too generally been conducted either empirically, or in the spirit of a narrow and exclusive system. Influenced by theory, or a predominant doctrine, some have referred mental disorders to inflammation, and have abused the various modes of blood-letting; others have believed that these disorders proceed from a morbid state of the biliary and digestive functions, and have disordered still more these functions and their respective organs by emetics and drastic purgatives; and many have considered the nervous influence solely in fault, and have attempted to correct it by means of antispasmodics and stimulants: hence the treatment has been nearly as often prejudicial as beneficial; and recovery has taken place, in many instances, *notwithstanding* the means that have been used, rather than *by the aid* of them.

398. *a.* When called to a case of insanity, the obvious duty of the physician is to ascertain the predisposing and exciting causes; the several circumstances co-operating with these causes, or contributing to their influence and intensity; the particular form or character of the disorder, its duration, and physical relations; the states of the several functions, organic and cerebro-spinal, and the connection that may exist between the mental disorder and the states of these functions, or of their respective organs. He will, moreover, observe whatever may exist of a pressing nature, or whatever indication there may be urgently re-

quiring to be fulfilled; as, for example, whether or not the signs of vascular determination to, or excitement in, the brain be obvious, and indicate impending risk to the organ; whether there be general vascular plethora or vascular inanition; whether some accustomed discharge, evacuation, or eruption has been suppressed; and whether or not the patient has been subject to some constitutional disorder, as gout or rheumatism. It is manifest that these are matters most necessary to be known, upon commencing the medical treatment of every case of mental disorder; and, without they are assiduously investigated, in no one instance can such disorder be appropriately treated. Where these more urgent indications exist, they require instant attention; — where the blood is strongly determined to the brain, the usual means of subduing the morbid action — local depletions, the cold affusion, or tepid douche or shower bath, external and internal revulsants and derivations, suitable diet and regimen, &c. — are requisite; — where the vascular system is plethoric or inordinately excited, sanguineous depletions, refrigerants, sedatives; evacuations from the bowels, the skin, and urinary organs; and low diet, are necessary; — where the catamenial or the hæmorrhoidal discharges, and eruptions or evacuations, either sanguineous or serous, or of other characters, have been suppressed, or have ceased to appear after the accustomed interval, the most active means must be prescribed, in order to reproduce them, or as substitutes for them.

399. *b.* Having removed the causes and concurring circumstances of the malady, — having thus fulfilled the more urgent and pressing indications, — and having remedied such morbid conditions of the organic functions as may have existed, — the more acute symptoms or stage of the malady will subside in about 8, 14, 21, or 28 days, or generally within 40 days, and a remission, or even an intermission, will occur. At this period, judicious and appropriate moral means should be brought in aid of the physical treatment; whilst the causes, moral, hygeienic, and pathological, ought to be removed or combated. If the recovery does not proceed satisfactorily, — or if these means, varied according to the particular circumstances of the case, do not produce beneficial results, — other remedies, sanctioned by experience, must be tried. These, however, will be fully noticed in the sequel.

400. *C.* As the malady thus lapses into a more or less *chronic form,* local or general manifestations of morbid action, which occasionally appear, return, or even remain, should be removed or suppressed by the usual and generally obvious means; and signs of disordered sensibility should be traced to their sources, and their pathological causes removed. Whenever disorder or disease of any organ in the abdominal or thoracic cavity is evinced, the fact of such disorder being frequently connected, either as cause or effect, with that state of the brain which occasions the disorder of its associated mind, should be kept in recollection; and an appropriate treatment ought to be directed to the quarter thus manifesting disordered sensibility or function, — always bearing in mind that morbid action in the substance of the brain is more frequently indicated by morbid sensations and disordered movements and functions in remote than in adjoining parts.

401. During the whole course of the treatment, the several organic and reproductive functions require attention. The state of the digestive organs, and especially of the biliary and the intestinal secretions, — and, indeed, the whole of the excretory functions — the fæcal, the urinary, and the cutaneous, — ought to be duly, or even daily, observed, and promoted whenever scanty or suppressed, or restrained when they become so excessive as to debilitate. More frequently, especially at the earlier periods of the malady, these functions require to be promoted; and as the defect, as well as the disorder, of these functions is often owing to impairment of the organic nervous or vital energies, the restoration of their healthy states should be attempted chiefly by means which will also invigorate these energies. With this intention, stomachics, tonics, or restoratives should be conjoined or alternated with purgatives, chologogues, or alteratives; and the bowels ought never be allowed to be confined, or the biliary secretion to be deficient. The appearances and the sediments of the urine should be ascertained, and alkalies or acids administered accordingly, with gentle stomachics and diuretics; and the action of the skin ought to be duly regulated by the cold, the shower, the tepid, or the warm bath, and by frictions and clothing, according to the form or stage of the malady, and the particular conditions of the cutaneous function. The states of the reproductive organs also require observation — especially of the uterus. And it should not be overlooked, that these organs are often abused by solitary indulgence, in such a manner as both to cause and to perpetuate the malady. Where this is detected, or even suspected, means should be contrived to prevent it. In advanced stages of insanity, although the treatment should be conducted, with reference to the removal of existing pathological states and of disordered mental manifestations, according to rational principles; still, when means thus devised fail of success, other and more empirical remedies, sanctioned by experience, ought not to be neglected. To these, however, sufficient reference will be made hereafter.

402. *D. The clothing* of insane persons, particularly of the melancholic, should be warm. In general, flannel may be worn next the surface; and dry friction every morning will be useful. The patient should sleep on a hair mattress, and hair pillow. His head ought to be somewhat elevated, and generally uncovered. The insane epileptic ought to sleep in a very low bed, to prevent accidents during a paroxysm. The propriety of devoting strict attention to cleanliness, in respect both of his person and clothes, is obvious.

403. *E. The food and diet* of the insane must necessarily be varied with the nature, complications, and stage of the disorder, and with the circumstances of particular cases. In the more acute attacks or stages of the malady, the diet and regimen ought generally to be antiphlogistic; at a later period, and in more chronic cases, and particularly in states evincing vital depression or exhaustion, the food should be more nutritious, in larger quantity, and easy of digestion; but hot spices and stimulants ought not to be allowed. During convalescence, the diet may be more substantial, but not heating; and duly regulated according to the exercise that is taken.

The meals should be at regular periods, and deliberately partaken of, and well masticated. A sufficient quantity of fluids should be allowed to assuage the thirst of the patient, which is generally urgent in mania, and in some cases of monomania; but they ought not to be given, unless when necessary, or when, in certain cases, a profuse use of them forms a part of the treatment.

404. F. *The management of convalescence* is one of the most difficult parts of the treatment of the insane. If the patient be not placed in favourable circumstances for some time after the subsidence of the malady; if he be not carefully and kindly watched; if contrarieties of mind, family dissentions, and all the remote causes, moral and physical, be not sedulously avoided; and if the diet, regimen, and mode of living be not suited to his constitution and the peculiarities of his late disorder, — the risk of a relapse will be great. At this period, and for long afterwards, much mental exertion or application, sudden bursts of passion, and excesses of every description, must be shunned; and the earliest manifestation of physical disorder — of headach, of disorder of the digestive organs, and of interruption of accustomed evacuations or discharges — should be met with local depletions, purgatives, revulsants, diaphoretics, and other means appropriate to the nature of the disorder. As convalescence proceeds, change of air and of scene, and travelling with a suitable companion, or one capable of amusing, fortifying, and even of controlling the mind, will be most beneficial; and such mineral waters as will promote the secretions and excretions, and at the same time strengthen the constitution, without exciting or heating the circulation, or determining the blood to the head, will often prove of essential service.

405. G. *The measures proper to prevent insanity, and more especially a relapse or return of it*, are most obviously presented to the reader in the full exposition I have given of the predisposing and exciting causes. The avoiding of these constitutes the chief, and, indeed, the only, *prophylaxis*. Young persons, whose parents have been the subjects of this malady, should have especial attention paid to both their physical and their mental developement; and whilst the former is promoted by exercise in the open air, and healthy occupation, the latter should be cultivated, without being over-exerted, and sound religious and moral principles ought to be inculcated; care being taken to avoid indulgence of the caprices, passions, and selfish feelings. The instruction of these persons should not be premature; but the desires and passions ought to be early restrained. The judgment should also be early and judiciously informed, without fatiguing the mind; and the control of parents or guardians ought to be prolonged for a considerable period after puberty, and until the mind, conduct, and constitution are fully formed.

406. ii. OF THE TREATMENT OF THE SPECIFIC FORMS OF INSANITY. — *A*. PARTIAL INSANITY. — *The simpler forms or slighter grades of insanity* severally require a moral management, as well as a medical treatment, appropriately directed to their different states and characters, — which, however, are so diversified as to preclude the possibility of my considering the subject with reference to any but those which are the more common and prominent. — *a. In the various states of moral insanity* (§ 69. *et seq.*), in which the patient is not labouring under any illusion, or erroneous conviction, or disorder of the understanding, the propriety of *seclusion* cannot be decided upon, excepting with reference to the features of, and the circumstances connected with, individual cases. Many of these states of moral disorder, consisting chiefly of errors in action and conduct, are not of that grave and well-marked kind which is considered in the eye of the law to require the privation of liberty; although, in the majority of such instances, the conduct of the patient may be such as will prove the most injurious to himself and to those depending upon him. In other less questionable cases of derangement, and where the disorder is so restricted as to leave the patient, according to appearances, the exercise of a great portion of his reason, it is often difficult to come to a determination as to the propriety of seclusion. The opposition which the patient may experience, may endanger the portion of intelligence that remains. It is as unnecessary as it is cruel, to deprive a person oppressed by distressing feelings, or prone to terror or alarm, of his friends and relatives — of the attentions of his family — as long as he entertains no vindictive feelings or dislike to them, and especially as long as his actions may be reasonably controlled by them.

407. *α*. In the state of gloom and mental depression to which some persons, the subjects of moral insanity, are prone (§ 73.), seclusion may be productive as readily of mischief as of benefit. For these, travelling, visiting watering places, medical treatment, the kind intercourse of those to whom the patient is partial, and the watchful attentions of the members of his family, or of those accustomed to attend upon persons in this state of mental affliction, should be tried before seclusion be resorted to. When suicide is contemplated, seclusion and control in an asylum will prove more successful than the most careful attentions in the bosom of the patient's family. Still, in the majority of such cases, this measure will be more successful chiefly in respect of the safe custody of the patient; for none besides will be equally secure. The most vigilant keepers may be deceived by him, when he is otherwise at large.

408. *β*. When the disorder is characterised by unnatural excitement (§ 74.), seclusion and confinement are often requisite, and are generally successful by inducing reflection. When persons thus affected have a propensity to intoxicating liquors, accessions of mania being thereby occasioned, seclusion is necessary; but upon the restoration of liberty the morbid disposition returns. In all cases of moral insanity where the morbid propensity is dangerous to the patient or to others, this measure becomes indispensable. When the disorder assumes a religious character (§ 75.), travelling, society, and a suitable moral and medical treatment, are preferable to seclusion; and confinement ought not to be resorted to, unless suicide have been attempted or contemplated.

409. The treatment of all the forms of moral insanity ought to be essentially, although not exclusively, *moral*. Comparatively few instances of these do not present more or less of physical disorder, seated either in the head itself, or in

some organ with which the brain sympathises. Of this I have already adduced sufficient evidence (§ 92—94.). The moral treatment, in all these, must be based upon a knowledge of the remote causes of individual cases, and should vary with the circumstances of each. It is impossible to state here in what this treatment should consist, with reference to such circumstances: the subject will be as fully treated of hereafter as my limits will permit. Wherever physical derangement can be detected, or to whatever organ it can be referred, appropriate medical means should be directed against it, whilst the patient is enjoying the advantages of a suitable moral management. The general health should receive due attention; and the functions of digestion, secretion, and excretion be duly promoted. Due restraint ought to be, as far as possible, imposed upon the passions and emotions; and change of air, wholesome exercise, and interesting occupations be prescribed.

410. γ. *The treatment of erotomania* should have reference chiefly to disordered circulation in the brain occasioned by an excited imagination and protracted desire, in connection with great susceptibility of the nervous system generally. If this affection be not alleviated, it will pass into more general disorder of the mental powers — especially into melancholia, mania, or some form of dementia. When it occasions emaciation and hectic fever, thereby menacing the life of the patient, marriage may be suggested. In this, as in nostalgia, the accomplishment of the desires of the patient is the chief or only remedy. When the object of desire is concealed, every art should be tried to ascertain its nature and source; as the effects upon the mind that will consequently result may be of much service, and a moral influence may be exerted over the patient with greater advantage. Where marriage is impossible, change of scene, travelling, society, and the amusements of watering-places, a tonic and restorative treatment, healthful and pleasant occupations, exercise in the open air in agreeable company, and suitable diet and regimen, are chiefly to be depended upon. When there is any evidence of increased determination of blood to the head, in this, as in other forms of moral insanity, and especially when the scalp is hot, or the eyes injected, the tepid or cold shower bath every morning will be found of great service.

411. δ. *The morbid propensity to intoxication* (§ 86.) is often attended by symptoms indicating not only a state of irritation of the stomach, but also a general depression of the nervous power. In this state, tonics, with small doses of ammonia, may be used with advantage; and, in order to counteract the injurious effects of the intoxicating fluids upon the system, to prevent the disorder from leading to more general and severe derangement of mind, and to disgust the patient with these fluids, tartarised antimony, ipecacuanha wine, or other nauseating drugs, and even the extract of elaterium, or croton oil, may be added to them before they are partaken of by the patient. In two cases, one of which I attended with Mr. HOOD, this method was found successful in causing a loathing of these fluids, in moderating the mania consequent upon the use of them, and in permanently restoring the patients. In both these cases, seclusion, and a sufficiently permanent and close restraint, could not be conveniently put in practice: this plan was, therefore, tried in the first instance, and succeeded in causing a distaste of all kinds of intoxicating liquors. To succeed, however, by means of it, requires great care and management on the part of the friends of the patient.

412. ε. *Homicidal insanity* (§ 89.) *and incendiarism* (§ 88.) are generally dependent upon an irregular activity of the circulation, or a morbid state of vascular action — especially in the brain. They are both frequently connected with disorder of the uterine organs, or suppression of the catamenia; and, in males, with derangement of the digestive organs, and with sanguineous determination to the head. Medical treatment in these cases is mainly to be trusted to; for the morbid impulse to commit these crimes is often so violent as to be instantly carried into effect, either before moral restraint can be exerted to counteract it, or because this restraint is habitually so feeble as to be inefficient, or is not roused to the least degree of activity. The impulse to perpetrate such crimes may, indeed, be looked upon as one of the modes in which physical disorder of the brain, arising either primarily or sympathetically, deranges the manifestations of mind,— those sentiments or propensities which circumstances have called into activity being thereby disordered or morbidly exalted. In many instances, also, there is reason to believe that the morbid impulse to commit crime is only the climax of an habitual indulgence of passion and feeling, to the constant neglect of moral principle and restraint; and is a tolerably obvious consequence of cerebral excitement, the effects of which are determined or manifested in this particular manner or direction, owing to various predisposing and concurring sentiments and circumstances.

413. In these cases, local or general depletions, according to the amount of local or general fulness, or of increased vascular action; the cold douche, cold affusion, or shower bath; active purgatives, revulsants, and derivatives; antimonial and other diaphoretics; digitalis and other sedatives; and the promotion of the secretions and excretions generally, — constitute the chief principles of treatment; aided, however, by a due moral influence, and by proper mental and physical occupation.

414. *b. Partial disorder of the understanding* (§ 95.) appears under so various and numerous forms as to require a treatment appropriate not only to each of these, but also to individual cases. Each patient should be a particular subject of study, and the moral and physical treatment directed according to the character and stage or duration of the disorder, and the various circumstances connected with its developement. — *α. Hypochondriacal monomania* is generally an extreme state of *hypochondriasis*, and more or less intimately connected with physical disorder, commonly commencing in the digestive organs, and consecutively affecting the brain. The treatment should not be materially different from that which I have recommended for that disease; and the *hygeienic means* there advised (see HYPOCHONDRIASIS, § 50.) especially should be adopted. In the majority of cases, complete seclusion will not be necessary, unless the patient contemplate or attempt suicide. More generally, however,

travelling, change of scene and of air, horse exercise, agreeable occupations, hunting, the amusements of society and of places of resort, — especially when attended and controlled by friends or suitable persons, — will be found most conducive to recovery, particularly if an appropriate medical treatment, and the use of mineral waters of a restorative and deobstruent or laxative kind, be pursued at the same time. Every method should be tried, and especially those just mentioned, to abstract or seduce the patient's attention from those feelings and ailments with which his mind is exclusively and morbidly occupied. The strictly medical means should be varied according to the peculiarities of individual cases; and the more urgent symptoms should be palliated by suitable remedies. The bowels ought never be allowed to become costive, and their functions should be promoted by aperients, conjoined with tonics, carminatives, and deobstruents. All the secretions and excretions should be duly promoted. Flatulence and gastrodynia must be allayed by magnesia, the hydrocyanic acid, gentle tonics, &c. variously combined; and by spare diet, consisting chiefly of warm milk, with bread or boiled rice, or other farinaceous articles.

415. *β. The treatment of melancholic monomania* (§ 106.) is most difficult; and, to be successful, requires a strict examination of the physical and moral causes of each case, and an appropriate employment of moral, hygeienic, and medical means.—(*a*) *Moral treatment* is of the greatest importance in this form of insanity, and in all its modifications, whether religious, or demonomaniac, or misanthropic, melancholia, or any other it may assume; but this part of my subject will be more appropriately considered hereafter.

416. (*b*) The *hygeienic measures* that may be resorted to, consist chiefly of attention to climate, residence, exercise, clothing, and diet. The patient should *reside* as much as possible in a moderately warm, or temperate, and dry air, or in a mild climate and a clear atmosphere; and if he must abide for a time in a place where these advantages are not enjoyed, he should choose spring and summer, and migrate during autumn to the milder climate, where he should reside during the winter and early spring months. The patient's *clothing* should be warm, and consist of flannel nearest the skin; and this should be frequently changed. As melancholics are subject to cold feet, these parts should be carefully protected.

417. (*c*) *Seclusion* — at least, complete seclusion — should be prescribed with great circumspection. There can be no doubt of its propriety when suicide is contemplated, or has been attempted. But in other cases, partial seclusion, particularly in connection with agreeable and interesting occupation, and amusement, is more safe and beneficial. Seclusion, however, even when complete, often re-establishes the moral powers, and the reasoning faculties, when they are exhausted by indulgence of the passions and desires.

418. (*d*) *Exercise* and suitable *occupation* are very important parts of the treatment of melancholia, and of all the states of partial insanity. Travelling, voyaging, — especially to a considerable distance, and with a fixed object, or with feelings of interest in what may result or occur, — is one of the best means that can be devised. Exercise on foot or on horseback, regularly taken, so as to promote the cutaneous excretion; occupations in the open air, which are attended by moderate physical exertion and mental excitement; hunting, shooting, and games of skill and activity, as cricket; and farming and gardening,—are severally of great benefit. The chief objection to the last of these, is the occasional stooping necessary to several of its duties. Billiards are also useful means, both of exercise, interest, and amusement. Whatever moderately excites, interests, and occupies the mind, is serviceable in the treatment of melancholia; and especially if it at the same time abstract the attention or imagination from the object of its illusion. When *music* is properly selected, and prosecuted so as to accomplish these objects, the advantages that may be derived from it are great. As to the selection of modes of occupation and exercise for individual cases, much should depend upon the patient's previous and existing tastes and habits. A principal intention in this class of disorders — in all forms of partial insanity — is, to detach the patient's attention, his mental devotion, from the object on which he has morbidly fixed it, to seduce it to other objects, and to engage it with different subjects and matters of interest and importance.

419. (*e*) *The diet* of melancholic patients should be light, digestible, and moderately nutritious. Salted, highly spiced, irritating, and oily or fat articles of food ought to be always avoided. The food should be simple, plainly dressed, consisting of very few articles at the same meal. Ripe and fresh fruits, in due season, may be allowed. The quantity and kind of food should have reference to the amount of exercise. When this is so great as to freely promote the cutaneous, biliary, and alvine evacuations, a more liberal diet may be permitted than in other circumstances. Great circumspection is requisite in allowing this class of patients restorative or exciting liquors. If the head be cool, and the action of the carotids rather below than above the healthy standard, these may be tried in small or very moderate quantity, and their effects observed. Generally, however, the influence of gentle tonic and restorative medicines should be previously tried.

420. (*f*) *Medical Treatment.*—The physical disorder requires, simultaneously with the adoption of the foregoing measures, and of suitable moral means, a judicious recourse to remedies calculated to promote or to correct the functions of the digestive organs, and, indeed, of all the abdominal viscera. There are very few of these viscera which have not betrayed more or less of disorder even long previously to the developement of the mental affection. The functions of the skin are usually impaired, and often require the tepid or the warm bath for their restoration. The alvine excretions— especially the intestinal — are generally retained, or voided imperfectly or with reluctance, owing manifestly to relaxation of the muscular tone of the bowels, and especially of the colon. The secretions are also deficient, and morbid from their retention. These physical conditions require for their removal the frequent use of aperients and laxatives, conjoined with tonics and other restoratives; for their continuance would increase that state of excrementitial plethora of the vascular system in which melancholia and hypochondriasis often originate, by depressing and disordering the vital manifestations of the brain. Even the urinary

secretion is deficient; the discharge of the more excrementitious materials from the blood by the kidneys being partially interrupted, or deficient in respect of certain of the constituents of the urine. In most instances, the morbid materials carried into the circulation, or accumulated in it, owing to defective powers of digestion and assimilation, are not sufficiently discharged from it by the action of the kidneys, bowels, liver, and skin; and thus the impure state of the blood influences the manifestations of the nervous centres. In such circumstances, the restoration of these functions by suitable hygeienic and medical treatment is always a principal indication of cure.

421. The chances of recovery from melancholia may be almost said to be great in proportion to the manifestation of disorder in the organs of digestion. As the pathological causes of the mental affection show themselves the more evidently, the greater hopes may be entertained of the disappearance of the latter with the removal of the former. Where these exist, the therapeutical intentions should be directed accordingly. If the function of any organ be impaired or interrupted, the restoration of it is indicated; — if the hæmorrhoidal or catamenial evacuation is suppressed, means should be taken to re-establish it; — if a cutaneous eruption have disappeared, or an accustomed ulceration or issue ceased to discharge, the skin should be acted upon, or some analogous mode of derivation and counter-irritation be adopted. It is, however, not always, nor even frequently, that melancholia can be referred to these, or equally manifest sources, and where such very obvious indications of cure as these present themselves. Still, there are generally to be observed certain conditions of the abdominal organs, of the cerebral and general circulation, and of the nervous system, which severally require attention, and furnish the basis of a rational method of treatment.

422. Where the functions of the digestive organs are sluggish, the bile is morbid, dark, irritating, or scanty, and the various secretions and excretions insufficient for the due purification of the blood, or for the preservation of it in a healthy condition, it is clearly indicated to restore these functions by means which shall impart a new impetus to the vital endowment of their respective organs, and enable them regularly to perform their offices. In a very large proportion of cases, not only is the bile morbid, but the whole abdominal secretions are disordered; and certain of them are retained on the intestinal mucous surfaces, or even accumulated in the cæcum and colon. The frequency of these changes, and the benefit resulting from the more certain means of removing them, induced the ancients to have recourse to black hellebore; and the moderns to milder cathartics, to purgatives, or to laxatives, in the treatment of this malady; and the propriety of the practice, when the means are well selected and combined, and judiciously managed, cannot be disputed. In some cases, — especially where there is much torpor of the biliary apparatus and of the bowels, with accumulated sordes on the digestive mucous surface, — a brisk *emetic*, or even an *emeto-cathartic*, is of great service early in the complaint, and at the commencement of the treatment. When the strength of the patient will permit, a continued action on the bowels — an artificial diarrhœa — should be kept up, by means of chologogue or stomachic purgatives or aperients, for a considerable period; and purgative enemata may also be employed. A combination of the compound infusions of gentian and senna, with a neutral salt, and an aromatic spirit or tincture (F. 266.), will be appropriate in these cases; and the spirit of turpentine, with castor or olive oil, may be prescribed in enemata. A similar means to these, of which a variety will be found in the *Appendix*, and in the articles Hypochondriasis and Indigestion, may be employed according to the peculiarities of individual cases. When the patient believes that his physical health is not in fault, or when there is a disposition to sanguineous determination to the head, James's powder, or tartarised antimony, may be given in small and frequently repeated doses, so as to keep up an action upon the skin or bowels, and to induce a feeling of bodily ailment, so as to dispose the patient to pursue a suitable treatment.

423. When indications of congestion of the brain, or of determination of blood to this part, or of general vascular plethora, or of inflammatory irritation of the gastro-intestinal mucous surface, or of fulness of the portal system, are observable, — and especially if they have become more evident after the disappearance of an accustomed evacuation, — general or local bloodletting should not be delayed. Local depletions are generally most appropriate in these circumstances, and ought to be decidedly employed — particularly in the more robust. Aretæus permitted bloodletting only in the young and robust, in this complaint, and in small quantity, and chiefly in spring; Cullen considered that it was rarely useful; Pinel seldom employed it; and Esquirol advised it in nearly the same circumstances as I have recommended it. The application of leeches, and even the repetition of them, to the vicinity of the vulva, or around the anus, when the catamenial or hæmorrhoidal evacuations have been interrupted, or the portal system congested; and to the epigastrium or hypochondria, or behind the ears, when uneasy sensations are referred to the enclosed organs, — is generally attended with benefit; and this evacuation may be repeated even oftener than once, and commonly with advantage, although it may be requisite to administer tonics, antispasmodics, or restoratives, at the same time.

424. Many cases of melancholia present a morbid susceptibility and sensibility of the nervous system. The patient is remarkably nervous; and his distress is evidently heightened by sanguineous depletions, however moderate; and by purgatives, if too frequently exhibited, or even if they operate beyond the mere evacuation of the bowels. Lorry has well described this form of melancholy; and very properly recommended for it calming measures, — opiates, with gentle stimulants and restoratives. In these cases, the warm or vapour bath, the tepid or warm douche, the affusion of warm or tepid water on the head, and the tepid bath, according to circumstances, will be of great service. Small doses of camphor, with opium, morphia, or hyoscyamus, or with the extract of poppy or lactucarium; the infusion or the ammoniated tincture of valerian, or both conjoined; the infusion or tincture of hop; and other antispasmodics and diffusive stimulants, va-

riously conjoined with sedatives, narcotics, &c., and a pure dry air, change of scene, and light food, — are generally beneficial in this state of disorder. If there be watchfulness and irritability, the hop-pillow, or the syrup of poppies, or the compound tincture of camphor, in a small enema, will afford relief. When the disorder has been caused by masturbation, the cold affusion or shower bath, the cold plunge bath, and tonics, — especially the muriated tincture of iron, — should be prescribed. As the energy of the nervous system returns, more permanent and energetic restoratives and tonics may be employed; but, during their use, the secretions and excretions ought to be carefully promoted, and the bowels kept freely open; care being taken to prevent congestions of the brain or portal system.

425. In many instances, a combination of the several indications based upon the conditions of the abdominal organs and of the vascular and nervous systems, and the association of more or less of the means required to fulfil these indications, are often both necessary and successful. Thus, it is frequently of the greatest advantage to act energetically upon the bowels by means of stomachic or chologogue purgatives; to deplete the vascular system, either generally or locally; and, at the same time, to give stimulants, antispasmodics, and tonics; the choice of the several means depending upon the characters and symptoms of individual cases. As to the propriety of exhibiting the more active tonics in melancholia, much doubt may be entertained: but if accumulations of morbid matters in the bowels have been removed; if the tongue be clean, moist, or watery; if the secretions and excretions have been improved; and if a trial of them be not productive of headach, of increased heat of the scalp, or of feverishness, — the use of them may be persisted in; care being taken to keep the bowels freely open, and to guard against local fulness or determination of blood. — The diet, regimen, and the management of convalescence, require no remarks beyond those which have already been made (§ 402—405.).

426. *c. Demonomania*, in its different forms, and especially *theomania*, or various states of religious insanity (§ 121. *et seq.*), require a somewhat similar plan of treatment, and the same indications of cure, as have been recommended for melancholia, with which they are more or less closely allied. Moral treatment is particularly necessary; but, equally with the physical, should be varied according to the peculiar features of individual cases. In all the modifications of religious insanity, the consolations of religion, administered by sincere, moderate, and rational ministers of it, are of the greatest service. I have witnessed this in several cases; and, when judicious moral and religious management is aided by a sound physical treatment, recovery will take place in the great majority of instances. In no form of insanity is greater care requisite than in this, to protect the unfortunate patient, and his near relatives, or members of his family, from his insane impulses to commit suicide or murder. PINEL states, that a person, after listening to an alarming sermon, considered himself as irretrievably lost, and murdered all his children, in order that they might not experience eternal damnation. ESQUIROL mentions the case of a woman, who entertained a similar idea, and attempted the lives of her children to preserve them from punishment in a future world; and numerous other instances of the same kind might be adduced. When persons thus disordered succeed in their horrible design, they rarely recover; for no sooner is reason restored, than the distress experienced by them, when reflecting upon the act they have committed, occasions a return of the malady.

427. The physical disorder, both antecedent to, and coëtaneous with, the mental disorder, should be carefully investigated; and particular attention devoted to the states of the brain, of the digestive organs, and of the uterine functions; and determination of blood to the head prevented by local depletions, the shower bath, or douche; by derivatives, and aperients. In the more robust and young, the preparations of antimony, in small doses, and occasionally in larger quantity so as to produce vomiting, are often of service.

428. In those cases, where the patient entertains the belief that he is changed into some animal, — or that he has changed his sex, — or that he has lost a portion of his body, — or that he carries about with him a living thing, or some strange substance in his abdomen, — or that some singular matter is substituted for one of his organs or members, and acts from this impression, — the success of treatment is often not great. In many of these, there is reason to suspect physical disorder, if not structural disease, in the organ or part to which the insane delusion is referred; and to that organ the investigation and the treatment should be especially directed.

429. *B.* TREATMENT of GENERAL INSANITY. — *a.* OF MANIA. — In treating mania, it is necessary to have a most intimate regard to the stage of the disease, — to the degree of general and cerebral vascular action, and vascular fulness, — and to the state of the secretions and excretions. The means which will prove most beneficial during the acute stage, and especially in the early part of it, will be inappropriate, or even injurious, in the chronic period, of the malady. — The treatment of mania is both *hygeienic* and *pharmaceutical.* The former comprises various moral, intellectual, and physical means: the latter, the internal remedies intended to subdue morbid action, and to restore the healthy functions. — *a.* At the commencement, and during the early or *acute stage*, of the malady, the patient should be placed in a large, darkened, and well-ventilated apartment, the air of which should be fresh and cool. Unless his violence is extreme, he ought to be allowed the full range of that, or even of an adjoining apartment, in the watchful care of sufficient attendants; and the restraint even of the strait waistcoat should be dispensed with, unless urgently required. Complete *seclusion* is most necessary, and it should be preferably conducted, in a large institution, conformably with what has already been advanced on this subject (§ 391.). All means of irritation or excitement should be prevented, as far as may be compatible with safety to the patient and those around him. The visits of relatives, connections, or even of acquaintances, should be prevented; and the patient ought to be exposed to the smallest possible number of impressions and causes of excitement. The diet should be rigidly antiphlogistic; and cooling diaphoretics, refrigerants, and diluents prescribed. The nitrate of potash,

the muriate of ammonia, the solution of the acetate of ammonia, the spirits of nitric æther, the solution of tartarised antimony, camphor julep, &c., may be severally used as refrigerant diaphoretics, or administered in the patient's usual drink; or any of the articles prescribed in the *Appendix* (F. 588. *et seq.*) may be employed with this intention.

430. In this form of insanity, patients ought neither to be retained in their own houses, nor confined to their beds. If they are turbulent, vociferous, and violent, their extravagance should be allowed to exhaust itself, without being perpetuated by the excitement of contradiction, irritating coercion, or violence — unless in as far as coercion is indispensable; and, as soon as it shall have served its purpose, it should be relaxed. Soothing means, with firmness, and decision when circumstances require it, should always be tried, and never departed from, even when the utmost restraint is also imposed. The perceptions of the maniac are seldom so entirely obscured as to render him incapable of understanding kind and soothing treatment, or to make him altogether insensible of considerate modes of having recourse to coercion. This has been proved by the able management of cases of this malady in the County Asylum, by Dr. Conolly. M. Esquirol also observed that coercive means should not be resorted to until the maniac risks his own life, or the lives of others; and even then they should be temporary, and be laid aside as soon as a calm takes place. When the patient will not pass the night in bed, it is better to leave him unrestrained than to coerce him, if he evince no mischievous tendency. This writer has found that the more that liberty has been granted to maniacs, without compromising their safety, the fewer have been the instances of furious mania, and the more rare the instances of the supervention of apoplexy and paralysis, — complications not infrequently produced by the irritation and excitement caused or perpetuated by unnecessary or prolonged restraint, or by restraint imposed in a harsh unfeeling manner. — The *moral treatment* should be conducted conformably with the principles which will be stated hereafter.

431. The *diet* may be more liberal as the disease passes from the acute to the more chronic stage; but in all periods, hunger or thirst, if not appeased, augment the irritation and violence of the patient. The food should be of the most digestible, and least exciting, kind. In some cases, at the commencement of the attack, all food is refused; but this repugnance wears off in a few days. Coercion, in such instances, is unnecessary, as the dislike arises either from gastric disorder, or from excessive cerebral excitement; and, in both circumstances, abstinence is a necessary part of the treatment. At a more advanced period, the farinaceous and leguminous articles of diet, warm milk with bread, rice and milk, ripe and seasonable fruits, and the white meats, are the most appropriate. The *drink* should always be cooling, and febrifuge, as already advised (§ 429.).

432. *β.* The *strictly medical treatment* requires the calmest consideration: the spirit of system, and an irrational method of routine, should be altogether banished; the means of cure should be appropriate to the peculiarities of each case at the time of prescribing for it. The exact pathological or physical conditions should be ascertained as correctly as possible, and remedies prescribed accordingly; and with due reference to the age, habit of body, temperament, modes of living, and occupations of the patient, — to the predisposing and exciting causes, — to the season, — and to the stage and previous character of the disease. — At the commencement of the attack, and if gastric disorder is manifest, one, or even two, *emetics* of tartarised antimony, dissolved in barley water, or in any other diluent, should be exhibited; but if there exist general plethora, as well as inordinate vascular action in the head, a full *bloodletting* should precede the emetic. After the operation of this latter, increased action should be moderated by the continued exhibition of the solution of antimony with liquor ammoniæ acetatis. It is sometimes requisite to repeat the bloodletting, — especially if redness of the face or eyes, noises in the ears, a pulsating pain in the temples, or increased heat of the scalp, or augmented action of the carotids, still continue. When the first bloodletting has been copious, a local depletion may be sufficient, — as *cupping* behind the ears, or in the nape; or the application of *leeches* to the temples, or around the base of the head, or even to the anus. Great care is requisite not to bleed too much; for if maniacs be too much reduced by sanguineous depletions, they are apt to lapse into dementia or imbecility.

433. After the operation of the emetic, a full dose of *calomel*, either alone, or with *James's powder*, may be given, and its operation promoted by some active *purgative* taken a few hours afterwards, — and preferably, according to my experience, by half an ounce, or six drachms, each of castor oil and spirits of turpentine, in any suitable vehicle. If the action of these be tardy or insufficient, it may be promoted by the same or other active cathartics prescribed in enemata. If the cerebral excitement continue after these, or return, the *warm* or *tepid bath*, or a bath of an intermediate temperature, may be used, — the patient remaining in it for a considerable time; *cold lotions* being applied to the head, or cold water being affused upon it. The bath may be resorted to, in this manner, every time that the delirium becomes violent. The bowels should be kept freely open during the attack; and the cooling *diaphoretics* already noticed, with *diuretics*, should be taken every four or five hours, — particularly the solutions of the acetate of ammonia and of tartarised antimony with the spirits of nitric æther. The patient's head ought to be kept cool by the usual means; and, if the heat be at any time considerable, the *ice-cap*, or the *cold affusion*, may be used.

434. When the violence of the symptoms is abated, the patient may be allowed more liberty, and permitted to enjoy the open air, where he may give vent to his excitement, which will the sooner pass off by being unrestrained. The *diet*, which was heretofore extremely restricted, may be more liberal; and, if intervals of reason occur, the utmost kindness and interest should be manifested for the patient; the *moral treatment* coming in aid of the *physical* and *medical* during the whole course of the malady. If critical evacuations are manifested, they should be promoted by a more nutritious regimen, by gentle tonics, or by means appropriate to the crisis that may appear.

435. The treatment is no longer rational, if all the periods and all the modifications of the disease are treated in the same manner. If mania have occurred after the suppression of an accustomed sanguineous discharge, early bloodletting, and subsequently *local depletions*, repeated at intervals, and in situations having reference to the accustomed evacuation, are indispensable. If it have appeared after delivery, or upon the suppression of the lochia, or of the milk, *purgatives, blisters, derivatives* and *revulsants, setons*, or *issues*, &c. are necessary. If it have followed some acute disease, upon too rapid growth, or on masturbation, the warm bath, with cold applications to the head; a nutritious and *milk diet*; the use of *asses' milk, tonics, cinchona*, or *quinine*, with acids; the cold *shower bath*, or *salt water bathing*, — will be most useful. But in all cases, — and especially when the mental disorder has supervened upon the disappearance of some cutaneous eruption, or of gout or rheumatism, — aperients, purgatives, blisters applied to the nape and kept open, or setons there, or other permanent irritants of the skin, will be found of service.

436. When mania appears in persons of a highly nervous temperament, it is generally independent of vascular fulness, or sometimes is even owing to a deficiency of blood, a larger proportion being determined to the brain than to the rest of the body. In this case, the *cold affusion* on the head, while the lower part of the body is immersed in a warm bath, or the *shower bath*, the patient standing in a pan of warm water, is generally beneficial. If the disease be attended by irritation of the reproductive organs, *tepid baths, cold enemata*, and the internal use of the *acetate of lead* with *hyoscyamus*, or of *ipecacuanha* with *opiates*, or *camphor* with *vinegar*, will be of service. In most cases characterised by nervous symptoms chiefly, the infusion and other preparations of *valerian*, small doses of camphor or of assafœtida, and *prussic acid* or *laurel water*, will be of use, when cautiously administered. In these especially, the cold *douche*, or affusion on the head, has both a physical and a moral effect in calming the patient.

437. If the disease resist these means rationally and appropriately employed, other remedies, of a more perturbating or empirical kind, may be tried; but these require the utmost caution, and their effects must be carefully watched. In strong, young, plethoric, and well-fed persons, bloodletting, generally or locally, may be repeated. When the propriety of venæsection is doubtful, small and repeated local depletions should be adopted, and those which may have a derivative effect ought to be preferred, — as four, five, or six leeches applied to the anus, and repeated every ten or fourteen days, according to the strength of the patient. The *semicupium*, cold applications to the head, and *purgatives* with colocynth or aloes, will also be required; and if these occasion an hæmorrhoidal affection, the circumstance may have a favourable influence on the mental disorder.

438. *Drastic purgatives* are often of service, and particularly in the more obstinate states of mania. They frequently bring away brown, greenish, tenacious, and otherwise morbid secretions, which had been long adhering to the intestinal mucous surface, or lodged in the cells of the colon and in the cæcum; and which had either predisposed to, or perpetuated, the mental disorder. In some instances, a prolonged course of purgatives is required fully to evacuate these accumulations; but, when this is necessary, the patient's strength should be prevented from sinking, by a fuller diet and a more restorative regimen than would otherwise be requisite. It is often difficult to administer these medicines so frequently, or in such quantity, as may be necessary, as maniacs are frequently persuaded that they are given to poison them; but such substances as may be taken in their food, — as calomel, croton oil, elaterium, &c., — may be employed. *Croton oil* may also be rubbed over the abdomen, and cathartic enemata liberally administered. In cases of this kind, the croton oil may be prescribed in small doses, with the extract of colocynth, or the compound camboge pill; and, when the patient has no reluctance to medicine, the compound infusions of gentian and senna, with the sulphate of potash and some purgative and carminative tincture; or a draught containing equal parts of castor oil and spirits of turpentine, may be preferred. If the purgatives occasion any increase of irritation, or are sluggish in their action, the warm or tepid bath will be found of great service.

439. When the integuments of the head appear engorged with blood, — and when, in the advanced course of the disease, or in its chronic state, the head or scalp seems congested, — small and repeated *cuppings*, behind the ears, or on the shaved scalp of the occiput, will often be serviceable; or *free incisions* may be made in this latter situation, as advised by Dr. Prichard, and kept open by lint, or by peas, in the manner of a common issue. In chronic cases, *moxas* and the *actual cautery*, applied to the occiput and to the nape, have been recommended by many Continental physicians; but the other measures just named, or setons or issues in these situations, are equally efficacious.

440. The propriety of exhibiting *opium* in mania has been much doubted. But, when sanguineous depletions have been duly prescribed, and morbid accumulations in the bowels freely and entirely evacuated, — if the scalp be neither remarkably hot, nor congested with blood, and if there be great restlessness, irritability, and want of sleep, — the maniacal excitement being the result rather of nervous disorder, than of vascular action, — the judicious exhibition of opium, or of *morphia*, — especially in conjunction with other appropriate medicines, — will often be productive of the greatest benefit. The opium, or the morphia, however, should be given in a full or very large dose; and, according to the peculiarities of the case, it may be conjoined with *camphor*, or *digitalis*, or *James's powder*, or *ipecacuanha*, or calomel, or with an alkaline carbonate, or with aromatics. There can be no doubt of the benefit which camphor may produce in this state of mania, although this also has been disputed. Those who possess weak powers of discrimination, whose knowledge of morbid actions, and of the operation of remedies, is deficient or limited, will frequently fail in obtaining the usual advantages from medicines, and will hence parade their scepticism as a mask for their ignorance; but *camphor* is a valuable remedy in the circumstances of the

disease now under consideration, — yet it requires caution; and, when conjoined with nitre, and given in small doses, in the more doubtful cases, or where heat of the scalp is still present, — or when prescribed with hyoscyamus, opium, or digitalis, or with vinegar, and in larger doses, in the chronic states, and after evacuations have been energetically employed, and exhaustion is about to supervene, — it generally is productive of the greatest benefit. If the premature or inappropriate use of it should increase the restlessness, or heat of the scalp, cold applications to the head, and diluents with vinegar internally, will soon remove all disorder, or even develope its good effects. — *Vinegar* was much praised by Aretæus, Locher, and others, in this malady; but Chiaruggi advised it to be given with camphor. One drachm of the latter may be dissolved in about two ounces of distilled vinegar, and from an eighth to a fourth part of the solution may be taken in any suitable vehicle, every four, five, six, or eight hours.—*Digitalis* has been recommended by Dr. Locher of Vienna, and by several British physicians, in this and similar states of mania; and when exhibited in full, or even large doses, it sometimes is of great service: but its effects require most careful watching, — especially when employed in the way most likely to prove beneficial. — The *surprise bath*, or sudden immersion in the sea, or in a cold bath, as advised by Van Helmont and others, as well as the *rotatory machine* of Darwin, although recommended by some writers, are dangerous and highly empirical modes of treatment, which are now justly abandoned.

441. *γ*. When mania assumes an *intermittent form*, the same principles of treatment as have now been advocated should be followed during each attack; and, when an intermission takes place, means should be used to prevent the accession of a paroxysm. — *Cinchona* and *sulphate of quinia* have been employed with this latter intention. Where vascular fulness and increased action, generally and locally, have been removed, and morbid secretions and fæcal accumulations have been entirely evacuated from the biliary organs and intestinal canal, the sulphate of quinine, conjoined with camphor, and with as much of the purified extract of aloes as will promote a free action of the bowels, and occasionally also with hyoscyamus, will prove useful during the intervals, if neither heat of scalp, headach, nor want of sleep, follow the use of it. My opportunities of resorting to this combination of means, in this particular state of disorder, have been few; but I have found the following of service: —

No. 270. ℞ Quinæ Disulphatis, Camphoræ rasæ et subactæ, āā ʒss.; Extr. Aloës purif. ʒss. ad ℈ijss.; Extr. Hyoscyami ʒj.; Syrupi Simp. q. s. M. Fiant, secundum artem, Pilulæ L., quarum capiat duas vel tres, bis terve in die.

442. When the patient has become calm, and begins to recognise his position and state, although some delusion or delirious excitement may remain or recur, or the moral affections may not be altogether restored, it will generally be proper to remove him from the place to which he had been confined, and to surround him with novel objects, by which he may be amused, or his mind more agreeably engaged, and where he may enjoy the advantages of air and exercise. In this stage of the disorder, a more nourishing and strengthening diet and regimen may be permitted. But, at all periods, the strictest attention should be paid to the secretions and excretions, as well as to calm the mental irritation, and to diminish the number of impressions and causes of excitement by which this irritation is perpetuated.

443. *δ*. *The convalescence* of maniacs is often prolonged and difficult; sometimes it is rapid. Some patients, when restored to their friends, to society, and to their natural habits, do not recover a complete state of health until many months have elapsed. These, especially, manifest great susceptibility and sensibility: they are readily vexed or irritated, are ashamed of their former condition, and often entertain fears at meeting with former friends. Some entertain a dislike, or a hostile feeling, to friends or persons who interested themselves in their behalf during their illness. Where this is evinced, the probability of a relapse, or of an attack of melancholia, or of an attempt at suicide, is great. Convalescents are generally very greatly benefited by travelling for some time, or by a sojourn in the country, or in some suitable place, before they are restored to their families, and are brought in intimate communication with their relatives and friends, or with those who were witnesses of their malady.

444. *b*. Treatment of Dementia and Fatuity. — The various states of dementia and fatuity generally present little hopes of success from either hygeienic, moral, or medical treatment. — *α*. That variety, which M. Esquirol has denominated *Acute Dementia* (§ 152.), is, however, very generally remedied by a restorative method of cure, — by walking and *horse exercise*, — by the *shower bath*, followed by frictions of the surface, — by light and nutritious diet, — by *stomachic aperients*, and attention to the secretions and excretions generally, — and by the exhibition of *antispasmodics* and *tonics* — especially valerian, musk, cinchona, ammonia, camphor, sulphate of quinine, &c., combined according to circumstances. The sulphate of quinine, conjoined with camphor, hyoscyamus, and as much aloes as may preserve the bowels gently open, is often of great service in these cases. The preparations of valerian with ammonia are also most useful. When evacuations have been suppressed, or eruptions have disappeared, these should be recalled, or others substituted in their place.

445. *β*. The *chronic* or *confirmed forms of dementia* and *fatuity* (§ 152. *et seq.*) require a *diet* and *regimen* suited to the peculiarities and circumstances of each case, and to the amount of exercise which is allowed, or the patient is capable of taking. In addition to strict attention to the states of the secretions and excretions, the *shower* or *cold bath*, or sea-bathing, followed by frictions of the surface; *blisters* applied behind the ears, or to the nape, and either frequently repeated, or kept open; *setons* or *issues* in the same situation; *moxas* applied to the occiput; *incisions* of the scalp, or the production of pustules on the shaved scalp by means of the *tartarised antimonial ointment*, — are the chief remedial means. In many cases, these should be conjoined with the restorative treatment just advised (§ 444.). In a very few instances, the occurrence of an attack of acute mania has had a critical effect. — In all cases, country air, moderate exercise, and such occupa-

tions as the incoherent, imbecile, or overthrown state of the mental powers will admit of being attempted, will prove of service — at least, as respects the patient's bodily health.

446. *C.* THE TREATMENT OF COMPLICATED INSANITY (§ 162. *et seq.*) is the most hopeless — especially when any of the forms of dementia are associated with *general paralysis.* — *a.* The means which have been just enumerated (§ 445.), are usually required in this complication; and care should be taken to prevent the bowels from becoming too *constipated* on the one hand, or too much *relaxed* on the other. In either case, inflammation, rapidly passing into sphacelation, generally results. In some instances, the removal, by mechanical means, of hardened fæces from the rectum becomes necessary when the constipation has been prolonged. —*Retention of urine* is an equally frequent and dangerous occurrence in the paralytic form of imbecility and incoherency, and requires a frequent recourse to the catheter.—*Incontinence of urine*, or a frequent dribbling, owing to over-distension of the bladder, is also a common symptom. In this latter case especially, care should be taken to keep the patient dry and clean, — as unconscious or involuntary discharges of either the urine or fæces, soon occasion gangrenous sores of the sacrum, or adjoining parts, in this class of patients. Care is also requisite to preserve them from falls, and from injury from fire.

447. *b. The complication of insanity with epilepsy or convulsions* (§ 174.) does not admit of any precise mode of treatment. The means should vary remarkably, or even be opposite, according to the form of the mental disorder, and to the evidence furnished by particular cases of the existence of general or local fulness of blood, or of increased action, or of organic lesion of the brain. When the convulsive paroxysm occurs *in the course of mania or monomania*, or is in any other way associated with either, general or local plethora, or increased vascular action, or even both, is generally present, and requires sanguineous depletions, the cold affusion or douche, derivatives, cathartics, low diet, and permanent revulsants, or counter-irritants. The principles of treatment stated in the article EPILEPSY, and those advised for *mania* (§ 432. *et seq.*), are usually appropriate in these cases: the application of the means to individual instances must depend upon the discrimination and judgment of the physician. When the paroxysm is connected with *demency* or *imbecility*, or *melancholia*, an irregular distribution or congestion of blood, or organic lesion of the brain or of its membranes, or even a deficiency of blood, may exist, and require the internal and external means already recommended for dementia (§ 444.), with many of those prescribed for the cerebral form of EPILEPSY (§ 61. *et seq.*).

448. *c. Apoplectic seizures* occurring in any form of insanity, should be treated according to pathological principles. If they take place early in *mania*, or in its acute state, general or local depletions, or both, and the other means already advised in *apoplexy*, as well as in acute mania, are generally requisite. But, when seizures of this kind, or resembling it, appear in the course of *demency* or *fatuity*, a want of vital power in the brain, with or without local or general deficiency of blood, or inanition, and, in some instances, with some degree of congestion, is most probable, and sanguineous depletions are then injurious; advantage being often derived from restoratives, when these can be administered, from blisters on the scalp, and from enemata containing assafœtida, camphor, &c. — The *coma* or *lethargy*, and the *vertigo*, often associated with incoherency and imbecility, require the same principles of treatment as now advised, in conjunction with the means recommended for dementia and fatuity.

449. *d. The other complications of insanity* (§ 181. *et seq.*) require but little remark. When the associated visceral disease is of such a kind as to perpetuate the mental disorder, — especially when the *digestive* and *reproductive organs* are deranged, — the removal of such disease becomes an important indication of cure requiring instant adoption; but the means which should be adopted for its removal must vary, or even be different, in different cases. No general principle can be stated, that can apply to all. The secretions and excretions, however, should be promoted; and the processes of assimilation and defæcation — of supply and waste — duly regulated, according to the wants of the economy, and the physical exertions of the patient.

450. iii. OF THE REMEDIES USED IN THE TREATMENT OF INSANITY. — My remarks on this head will be as brief as compatible with the due consideration of some points, respecting which the opinions of the most experienced writers on insanity are greatly at variance, and which could not be so appropriately discussed as in this place. And at the same time that I thus consider the different or opposite views entertained as to the efficacy of certain remedies, I shall also notice other medicines, which have been employed in some states of mental disorder, but to which I have, yet, either not sufficiently, or not at all, directed attention.

451. *A. Bleeding.* — *a.* Great difference of opinion exists as to the propriety of *general bloodletting* in insanity. Dr. CULLEN advised it in the early stage, especially where there are fulness and frequency of pulse, and marks of increased impetus in the vessels of the head; but he admitted that, when the disease has subsisted for some time, he has seldom found it of service. Dr. RUSH carried this treatment further than any other writer of eminence; and urged numerous arguments in support of it, some of which are deserving of attention. He advised large bloodlettings, in the standing or sitting posture, early in mania; and, if the patient bore the depletion without syncope, he directed from twenty to forty ounces of blood to be taken. He was of opinion that this evacuation ought to be carried further in madness, than in any other acute disease whatever; and recommended it to be followed by local depletions, by low diet and refrigerant medicines, by cold applied to the head, and by tepid or warm baths. WEBER, BRÜCKMANN, and J. FRANK carried bloodletting nearly as far as Dr. RUSH. Dr. HASLAM is also favourable to a decided recourse to vascular depletion in madness, though he does not advise it nearly to the extent directed by Dr. RUSH and Dr. J. FRANK; and he considers it equally beneficial in melancholia as in mania. He, however, judiciously limits it

to recent cases and plethoric habits, and prefers cupping on the scalp to venæsection; the quantity of blood to be taken, varying from eight to sixteen ounces, and the operation being repeated as circumstances may require.

452. On the other hand, PINEL considered the signs of vascular action in the head, and of determination of blood thither, as very deceptive; and that bleeding, even in maniacal cases, accompanied by symptoms supposed to indicate plethora and determination to the head, tends to retard recovery, and to render it more doubtful, and to cause mania to degenerate into dementia. M. ESQUIROL coincides with PINEL in believing madness to be sometimes changed for the worse by bleeding. He has seen it increased even after an abundant flow of the catamenia; and has observed melancholia pass into furious mania after venæsection. He, however, approves of moderate bloodletting in plethoric cases, and when some accustomed sanguineous evacuation has been suppressed. Dr. BURROWS has stated, that, following example rather than experience, he tried bloodletting for several years; but discovering his error, he became more cautious, and ordered venæsection scarcely in six cases of simple mania or melancholia in as many years; and that, since he changed his practice, more patients have recovered, and the cases have been less tedious and intractable. Nevertheless, Dr. BURROWS, as well as others who condemn general bloodletting even in mania or melancholia, is favourable to local bleedings,—which, he believes, can seldom be dispensed with in recent cases. M. GUISLAIN observes, that most of the cases admitted in the institutions for the insane in Belgium, have been treated by bloodletting before their admission; but that, with few exceptions, the disorder has been aggravated by the practice. He, however, admits the propriety of this measure in the circumstances in which I have advised it in the foregoing section. Dr. SEYMOUR states, as the results of his inquiries of Messrs. BEVERLEY and PHILLIPS, the medical attendants in the Asylum on Bethnal Green, which receives about 400 patients, that the number of those admitted with vascular excitement, requiring bloodletting, are very few indeed; and that the lancet is very seldom used in cases of excitement, if there be no evident effect upon the brain from increased arterial action, so as to induce the fear of approaching apoplexy or paralysis. The reason they assign for not resorting to bloodletting, is, that, having done so in several instances, the result was very unfavourable. The patients were reduced from the loss of blood, and the excitement was not abated: the tongue became typhoid, and the patient sank into a state of collapse, and died. Dr. F. WILLIS also condemns both general and local depletions: and Dr. PRICHARD states, on the authority of Mr. HITCH, that Dr. SHUTE has proscribed the use of the lancet, leeches, cupping-glasses, blisters, drastic purgatives, and the practice of shaving the head, at the Gloucester Lunatic Asylum; and yet, that the proportion of recoveries in this hospital is very large, and that no cases of sudden apoplexy or hemiplegia have happened. Before this practice, however, can be correctly estimated in respect of the treatment of insanity generally, the circumstances connected with the cases for which it was employed should be detailed; and it should be remembered, that a very large proportion of cases sent to lunatic asylums has undergone a more or less active treatment before their admission into these institutions.

453. *b. Local bloodlettings* have been more generally adopted in the treatment of insanity, than venæsection; and they admit of less marked difference of opinion as to the propriety of resorting to them, — many of those who object to the latter, adopting the former. Nevertheless, even local depletions require caution, and are most appropriate in recent cases of mania, and of melancholia. The latter form of disorder requires this mode of depletion almost as frequently as mania, although not generally to the same extent. — The situation of local bleeding is often of importance; and I believe that the occiput, or the spaces behind both ears, and the nape of the neck, should be preferred. The circumstances indicating the amount of depletion, and the frequency of its repetition, are the same as those which show the propriety of the practice on its first adoption. The discrimination and judgment of the physician must guide him in these particulars; but the presence or absence of certain symptoms, about to be noticed (§ 460.), will generally guide his decision.

454. *c. As to vascular depletions*, however practised, no general rules can be assigned. Each case of insanity presents a distinct subject of study as to this practice; and a correct judgment can be formed only after taking into consideration a number of circumstances connected with the age, previous health, nutrition, and occupations of the patient; with the causes of the malady, and with the states of vascular action and vital power. Amongst the more recent writers on insanity, M. FOVILLE, M. ESQUIROL, and Dr. PRICHARD have formed the most correct views as to the propriety of vascular depletions in this malady. According to my limited experience, however, the first and last of these writers may be considered as somewhat too partial to the practice; whilst M. ESQUIROL may be viewed as placing rather too little dependence upon it. Estimates formed respecting it, from the results obtained in public institutions, cannot always be depended upon, unless all the circumstances were known connected with the great majority of patients admitted into them — with the particular classes of patients that they commonly receive; for, in some public, or even private, asylums, many patients are admitted, who have not received benefit from vascular depletion, or for whom it has been injudiciously employed; whilst those for whom it has been properly prescribed, as to quantity or repetition, and who have recovered after recourse had been had to it, require not the aid of those institutions. Besides, of the numbers sent to asylums, there are comparatively few cases which are strictly recent, or in which the period of deriving benefit from vascular depletion is not already passed; and it should also be recollected, that by far the greatest number of those who are admitted into public institutions for the insane, have become deranged from those predisposing and exciting causes which exhaust physical as well as mental power, and that they are precisely the class of subjects least able to bear evacuations, or other depressing means of cure.

455. The lesions found in dissections of chronic cases, by MM. **BAYLE**, **CALMEIL**, **FOVILLE**, and others, show that they are incompatible with the due exercise of an organ so delicate as the brain, and with the healthy manifestation of the mental powers. And, whether mental exertion or emotion disorder the circulation of this organ, and, consecutively, the material fabric, the integrity of which is necessary to the due performance of the mental operations; or whether the circulation, or the structure of the organ, is the first to be affected, and the mind the last to suffer; still such means as reason suggests, and experience has shown, to be most efficacious for quieting excited and disordered vascular action, generally and locally, without materially depressing or exhausting vital power, cannot safely be always, or even generally, dispensed with.

456. M. **FOVILLE** states that, during many years of extensive practice in one of the largest lunatic institutions in France, he has had recourse to evacuations of blood, general or local, abundant or in moderation, rare or frequent, according to the strength of the patient, the state of the pulse, the redness of the eyes, the heat of the head, and the agitation and want of sleep, in the greater number of cases of recent insanity which have been placed under his care. He has preferred general bleeding, where there existed general plethora; but, in opposite circumstances, he has found leeches on the neck, the temples, or behind the ears, or cupping upon the same parts, or on the shaved scalp, to produce decided benefit. He considers local bleeding so very serviceable, as to prescribe it in addition to general bleeding, when the symptoms imperiously demand this latter evacuation; yet he never rests exclusively upon the efficacy of vascular depletion, but has recourse to other means. He adds, that he has had many cases of intermittent madness, the attacks of which had lasted three or four months, or even longer, when left to nature; but that there was not a single attack of a month's duration, since they were treated by bloodletting, and by warm baths with cold applications to the head at the same time; and that the symptoms were often dissipated in five or six days by these means. The experience and views of Dr. **PRICHARD** as to this point entirely agree with those of M. **FOVILLE**. Indeed, the practice was advocated by him (*Treat. on Dis. of the Nervous System*, ch. i. Lond. 1822.), long before the treatise of M. **FOVILLE** appeared. In estimating, however, the opinions of physicians attached to public institutions for the insane, as to the propriety or extent of vascular depletions, the sphere of their practice should not be altogether unheeded, and especially the circumstance of the patients having been treated previously to their admission, and the duration even of those which have been called recent cases. It is very obvious, that a patient who has been ill only three or four days, but during that time has been very actively treated, will not bear evacuating means on admission into an asylum; whilst another case, that would have been benefited by vascular depletions in the first few days of the malady, may be injured by them after a week or a fortnight had elapsed,—and this, and even other cases of much longer duration, are usually considered as recent. After all that can be advanced on this point, the propriety of prescribing sanguineous depletions, to whatever extent, must depend upon the pathological knowledge and discrimination of the physician; and if he possess not these qualifications in a high degree,—and unless he study and practice his profession as a whole, and as a profound and comprehensive science, and not as a trade or mechanical art, divisible into a number of separate parts, he cannot truly possess them,—he is quite incapable of rationally and judiciously treating insanity, or any other class of maladies.

457. *d.* There are numerous circumstances which should be duly considered before sanguineous depletions are prescribed for insanity. The predisposing and exciting causes, and the various concurring influences, should be ascertained and kept in view; the age, habit of body, constitution, and occupations of the patient, must be taken into account; and the duration of the distemper, and the means which have been already employed, ought to be precisely known. Next, the exact pathological conditions of the patient should be inquired into, and made the principal basis of the indications of the physical and medical treatment. If the patient be young, plethoric, or strong; if the attack has been acute and sudden; if the carotids and temporal arteries pulsate strongly; if the surface, and especially that of the head, be hot; if the face be red, or the conjunctiva injected, and the pupil contracted; if intolerance of light or of noise, want of sleep, spectral appearances, disordered sensation, and much agitation, be present;—the abstraction, from the arm, of twelve, fifteen, or eighteen ounces of blood will generally be productive of benefit, if it be practised within the first few days of the attack. If the good effect be only temporary, cupping upon the nape, or on the occiput, or behind the ears, will generally be requisite, and should be preferred to a repetition of venæsection.

458. The suppression of evacuations and of eruptions indicates, as M. **ESQUIROL** insists, the propriety of vascular depletion; and this is the case generally; but care should be taken in prescribing it, even in such circumstances, if the foregoing indications of its propriety are not present in some degree or number. The suppression is an important reason for having recourse to bloodletting; but it should not be the only reason by which the physician is guided in the matter. The mode, or situation, of local depletion, in such cases, should have reference to the evacuation which has been suppressed. If the catamenia or the hæmorrhoids have disappeared, previously to the attack, leeches may be applied to the highest parts of the insides of the thighs, or around the anus.—Acute mania most frequently requires vascular depletion; and next, melancholia. For the latter, venæsection is seldom necessary; cupping behind the ears, or on the occiput, or on the nape, being preferable. The practice is sometimes also requisite in some other states of partial insanity, particularly after the disappearance of an accustomed discharge or eruption. Whenever melancholia or any other form of partial insanity is attended by headach, or by a feeling of oppression or of weight in the head, by a full state of the blood-vessels, and by constipation, bloodletting is necessary. In the more doubtful cases, the application of leeches, or cupping, behind the ears, so as to abstract six, eight, or ten ounces of blood;

or even a smaller quantity, in persons of a weak constitution, is generally beneficial. The earlier in the attack that depletion can be resorted to, the more certain and permanent will be the benefit to be derived from it; and even when an attack is threatened or impending, it should be had recourse to, if the circumstances and symptoms indicating the propriety of it (§ 457.) are more or less manifest.

459. *e.* The *repetition* of vascular depletion should be guided by the same indications as point out the propriety of it in the first instance: when these continue or return, local depletion especially may be safely prescribed a second or even third time,—varying, however, the quantity, with existing symptoms, and with the effects produced by the previous evacuation, and with those observed at the time. The absence of redness or flushing of the face, or even pallor of the countenance, may not be a reason against depletion, especially if the other indications of the propriety of it are present.—When bloodletting in any mode is indicated, it should be performed in a standing, or sitting, or reclining position; and on the first sign of an effect having been produced in the pulse by it, or of faintness, the abstraction of blood should cease.

460. *f.* It is of great importance to attend to all the *circumstances and symptoms indicating the impropriety of vascular depletion* in the treatment of this class of disorders. These are, chiefly—far advanced age, debility, exhaustion of the vital power, and the puerperal states; the operation of those predisposing and exciting causes which depress or exhaust the vital energies, the physical functions, and mental faculties; continued addiction to the vice of masturbation, or to the inordinate use of spirituous liquors, or to narcotics; insufficient nutrition previously to the attack; all indications of weakness and irritability, without power or tone; and all approximations to the state characteristic of delirium tremens, as a pale or collapsed countenance—very quick, tremulous or small, irregular, soft pulse—copious perspirations,—a terrified, fearful, and agitated state of mind—insensibility of external impressions, and tremors of the extremities. Wherever the tongue is tremulous, or the voice weak or tremulous, the hands unsteady, the pulse weak, quick, or open, and readily compressed;—or when the extremities and skin are cold, damp, or clammy; or the sweats profuse, and the tongue is covered with a dark, brown, mucous coating,—however great the maniacal or delirious excitement and agitation may be,—sanguineous depletion will then be injurious. A natural temperature, or coolness of the scalp; weak action of the carotids, and great frequency of the pulse, with swimmings or giddiness on assuming the standing or sitting position, are also strong indications of the impropriety of bloodletting.

461. *B. The abstraction of heat from the head, bathing, &c.*—The hair should be removed from the head in all acute cases; and where there are great heat of the scalp, and vascular excitement, particularly in mania, the head ought to be shaved. —*a.* For young, robust, and maniacal patients, the *shower bath,* twice or thrice a day,—or the *affusion of cold water* on the head,—is of the greatest benefit, and is recommended by Celsus, Rush, Esquirol, Burrows, Foville, Prichard, and many others.—When hysterical symptoms are associated with insanity, the affusion of cold water on the head is especially beneficial. Both the cold shower bath, and the cold affusion, are sometimes followed by reaction, and consequent excitement and violence, particularly in irritable temperaments. In these cases, a repetition of the treatment, and the continued application of cold to the head, by means of evaporating lotions, or the *ice-cap,* will generally be necessary. M. Foville places a cap on the head containing ice, and keeps the body immersed in a warm bath for two or three hours; and repeats this practice twice or thrice in the day, according to the violence of the symptoms. At first, he found, when resorting to it only once a day, that reaction, with increased agitation, not infrequently supervened; but, on repeating the bath, and keeping the ice constantly applied to the head, the success of the treatment has been much greater. This combination of warm and tepid bathing with cold applications of various kinds to the head was, however, long previously advised by Daniel and Folberg.

462. The foregoing modes of abstracting heat from the head, as well as the application of evaporating lotions, are serviceable chiefly in *recent cases,* where there are much heat of the scalp, and irritability; but they should be discontinued when the temperature is reduced to the natural standard, and repeated as soon as it rises above it. Intense cold applied to the head, in chronic states of insanity, although the patient be noisy and violent, seldom induces sleep or quiescence: it may even become a source of irritation. The temperature of the scalp should be a guide to the practice in all cases. It may be stated as a general rule, that the heads of all insane persons should be kept cool, and the hair closely cut. They should never wear any covering on the head, when within doors. The only exceptions to the rule are furnished by some cases of dementia, or partial insanity, where the low temperature of the head, and weak action of the carotids, indicate insufficent vascular action and tone in the brain: in these cases, the hair may be worn longer than in others. Insane patients should also sleep with their heads more or less raised.

463. *b.* The *tepid douche* or affusion, *tepid shower bath,* or even the *warm douche,* are severally of use, in certain states of mental disorder, especially when there are great restlessness and want of sleep. In melancholia, I have found the tepid shower bath, commencing with the water at 90°, and gradually lowering the temperature to 80°, and ultimately to 60° or 50°, of great benefit. The *warm douche,* or *affusion,* is most appropriate to delicate females, or to persons of great susceptibility and irritability, conjoined with weak action and deficient vital power; and particularly when there is prolonged watchfulness. *Warm* and *tepid bathing* are extremely serviceable in most cases of insanity, when judiciously managed and conjoined with other appropriate means. If there be great vascular action generally, as well as locally, as in recent maniacal cases, tepid bathing will then be appropriate. If the lower extremities are cold, and the general surface is either of the natural temperature, or below it, warm bathing is particularly indicated. If there are chronic eruptions on the skin, a languid circulation, sleeplessness, and irritability, the warm bath continued for a considerable

time, and frequently repeated, is especially beneficial. In many cases, increased heat of the scalp exists in connection with these states of the general surface and extremities; and for these, the addition of mustard or of salt, or both, to the warm water, whilst cold, in some form, is applied to the head, will be of great service, particularly in the more recent cases. The association of cold applications to the head, and of the *warm semicupium* or *pediluvia*, either simple or medicated, is also useful, particularly when there are much restlessness and watchfulness. — *Cold bathing*, especially salt water bathing, is sometimes of service in chronic mania, and in melancholia; but chiefly during convalescence, and when tonics, change of air, and invigorating regimen, are necessary. It has been advised by numerous writers, but it requires a careful consideration of various circumstances connected with each form of insanity, and with individual cases, before it should be carried into practice. — The *bath of surprise*, or suddenly plunging the patient into a cold bath, and keeping him immersed in it for some time, or until incipient asphyxia is produced, although recommended by BAGLIVI and BOERHAAVE, is not only an empirical, but also a dangerous practice. It has been said to have cured many,—that is, many have recovered *after* having had recourse to it; a few, probably, almost immediately; but others have experienced attacks of apoplexy, or of epilepsy, or even of palsy, in consequence of it. The cold shower bath is certainly the safest and most generally applicable mode of cold bathing, for any form of mental disorder: the temperature, as well as the quantity of water, being varied according to the circumstances of the case.

464. C. *Emetics* have been recommended by many writers, in this class of disorders, and especially by MONRO, PERFECT, SELIG, RANÖE, J. FRANK, RUSH, COX, ESQUIROL, and PRICHARD. They are more particularly indicated in melancholia. Dr. BURROWS has had recourse to them, chiefly to free the stomach from troublesome ingesta, accumulated phlegm, or morbid bile; and sometimes to give activity to torpid viscera. He has found them useful, also, by interrupting intense abstractions, hallucinations, and capricious resolutions; and when urine has been retained from obstinacy. They are, however, still more beneficial, by emulging the biliary organs, by evacuating mucous sordes from the stomach, and by rousing the organic and assimilating functions. Dr. COX states, that in every species and degree of maniacal disease, emetics have proved valuable and efficacious; and Dr. PRICHARD adds, that Dr. WAKE, physician to the York Lunatic Asylum, has assured him, that he has found no remedies so frequently efficacious as emetics. Dr. HASLAM, however, although he confirms their utility in cases attended by disorder of the stomach, declares that, after the administration of many thousand emetics, to persons who were insane, but otherwise in good health, he never saw any benefit derived from them. The experience of ESQUIROL, FOVILLE, and PRICHARD, respecting them, agrees with my own observation: they are precluded by a plethoric habit, and cerebral congestion — at least, until these are removed. They are most likely to be of service in hypochondriacal dejection and melancholia, attended by torpor; and when the secreting functions and vital actions require to be stimulated and roused. They are also, sometimes, useful during states of furious excitement, — producing calmness, and restoration of sleep. Where there is a morbid addiction to intoxicating liquors, or a ravenous appetite, in maniacal cases, tartar emetic added to these liquors, or to the food, so as to produce either nausea or vomiting, is often of service. When there is much determination of blood to the head, and in other circumstances connected with insanity, vomiting is frequently excited by tartar emetic, or even by other substances, with great difficulty. In these cases, the *cold affusion* on the head, soon after the emetic has been taken, will often cause its operation, as well as protect the brain from the ill consequences of its operation. A combination of emetics is also of use, in these respects.

465. *D. Purgatives.*—*a*. The propriety of exhibiting cathartics or purgatives in the treatment of mental disorders is undoubted; but there are various circumstances, complications, and states of these disorders, which contra-indicate their use. There can be no hesitation in prohibiting them, when there is any indication of inflammatory action in the digestive mucous surface. This surface is often inordinately irritated, or even ulcerated in the more chronic states of insanity, and especially in dementia, imbecility, and fatuity; and where such is the case, purgatives are generally injurious. In other circumstances, purgative medicines, judiciously selected, combined, and managed, are amongst the most important means which can be prescribed in mental derangement. The chief difficulties are the selection and combination of them, appropriately to the circumstances of individual cases; and, in the ability of overcoming these difficulties, the science, ability, and success of the physician consist. Dr. PRICHARD remarks, that "the mildest cathartics are preferable to others in most instances, because their use can be long continued without injury to the structures on which they immediately act;" and that "the neutral salts, infusion of senna, rhubarb, jalap, castor oil, are, in the majority of cases, sufficiently powerful, and may be used daily or frequently, according to circumstances." More active purgatives than these are, however, often necessary in the early and acute stage of insanity, — and especially in melancholia, mania, and some states of partial insanity. In these, particularly, the intestinal and biliary secretions are frequently viscid and morbid; and the cells of the colon and cæcum are loaded with these and other fæcal matters. Hence a continued use of the more attenuating and solvent purgatives, and an occasional, or even frequent, recourse to the more active cathartics, aided by cathartic enemata, are necessary to the obtaining of the effects which these medicines are capable of producing on the mental disorder. MONTANUS was correct, when he said that half purges tire and molest the body without being of much service; — and hence the partiality of the ancients for the more drastic purgatives, as well as many of the older physicians among the moderns, in the more acute forms of insanity. WILLIS gave a scruple each of calomel and extract of black hellebore, with six grains of extract of jalap, in melancholia; and, although the quantities may appear great, yet it should be remembered that calomel in this dose will produce a solvent, rather than a purgative, effect, and that much of the virtues of

extracts were dissipated by the mode of preparation in those days.

466. *b.* That the virtues ascribed to *hellebore* by the ancients, in mania and melancholia, were not greatly overrated, may be inferred from the confidence reposed in it down almost to the present time, and still confided in it through Germany. CELSUS gave the black hellebore in melancholia, and the white in mania: ARETÆUS preferred the former, and MAYERNE the latter. Both species are employed on the Continent; but the black is more frequently used. BERENDS, GREDING, HUFELAND, PLOUCQUET, &c. prefer it to the other purgatives; and QUARIN prescribes it in the form of BACHER's pills (F. 156.). Dr. BURROWS, however, states that he has tried the extract of both the black and the white species, and found their operation very uncertain, and their effects, both upon the mental disorder and upon the excretions, in no way different from other purgatives or emetics. The extract of the *Gratiola officinalis* was much praised by FISCHER, LENTIN, HUFELAND, and SCHMIDTMANN; *aloes*, by ARETÆUS, and many others; and *jalap*, by RADEMACHER.

467. *c.* In the acute and early stages of the disease, with manifest congestion or determination of blood to the brain, I have preferred full doses of calomel with extract of colocynth and scammony, or with the compound camboge pill, given late at night, and followed in the morning occasionally by about four, five, or six drachms each of castor oil and spirits of turpentine, taken on the surface of milk, or of some aromatic water. If these do not operate copiously, an *enema*, containing about double the quantity of the oils, should be administered in the course of the day. I have found these oils the most efficacious purgatives — particularly as respects their operation on the mental disorder — in the early stages of mania. In some cases, it will be serviceable to trust to the more common purgative pills, with the addition of a little croton oil, to sharpen their action. After a time, the calomel may be omitted; but, during the acute state of disease, purgatives should be continued until the appearances of the tongue and of the evacuations improve. In many cases, — especially those attended by much vascular excitement, — the addition of tartarised antimony, or of ipecacuanha, to the purgative, will greatly promote its operation, and keep down vascular action. When it is desirable to produce both an emetic and a purgative operation, as in several states of mania, a solution of Epsom salts, or of sulphate of soda, to which tartar emetic has been added, may be taken every hour or half hour, until the effect ensues. It may afterwards be continued at longer intervals, so as to act freely on the bowels.

468. *d.* In the more chronic states of insanity, — and especially when there is much irritability or want of power, or when the tongue continues loaded and furred, but moist, — notwithstanding the frequent exhibition of purgatives, tonics should be conjoined with them; and the constitutional powers ought to be supported by suitable diet and restorative medicines. In these circumstances, the compound infusions of gentian and of senna, with sulphate of potash, or sulphate of magnesia, or with tartrate of potash, and an aromatic tincture (F. 266.), or the extract of aloes with sulphate of quinine and camphor (§ 441.), will generally prove not only efficacious in their action on the bowels, but also beneficial as respects the mental disorder.

469. *e.* In respect of *purgatives*, as well as of *bleeding*, it may be observed, that, when insanity proceeds from *moral* and *depressing causes*, they are not generally beneficial, unless conjoined with tonics; and that frequent doses of calomel in such circumstances are often injurious. Purgatives, however, of a *stomachic* kind, or a combination of them with *restorative* medicines, is requisite, in order to promote the secretions and excretions.

470. E. *Mercury.*—Mercurials may be employed for mental disorders with three intentions: — 1st, to evacuate biliary and fæcal accumulations; — 2d, to improve the secretions, particularly that of the liver; — and, 3d, to produce a copious flow of saliva. — To fulfil the *first* of these intentions, calomel is extremely useful, — particularly in melancholia and in mania, — but it should be conjoined with, or followed by, other purgatives. To produce the *second* effect, any of the mercurial preparations may be employed, either alone, or with emetic tartar, digitalis, camphor, narcotics, &c. To accomplish the *third* end, calomel, blue pill, or the bichloride of mercury, may be given in any of the foregoing combinations, or alone. Mercury may also be exhibited in such a manner as to produce both a tonic and an alterative effect. With this view, small doses of the bichloride may be given in a tonic tincture or infusion; or small doses of PLUMMER's or the blue pill may be taken on alternate nights. The employment of mercurials to an extent likely to produce salivation, or with this intention, is of very doubtful propriety; but was recommended with this view by WILLIS, ROLFINCK, PERFECT, SMITH, and others. Mercurial salivation was much praised by RUSH. Dr. PRICHARD remarks, that it is by no means a general remedy for maniacal diseases; but in cases of torpor, with suppression, or a very scanty state, of any of the secretions, it is frequently advantageous. He adds, that mercury should be used in mild alterative doses, and discontinued as soon as the gums become slightly affected. Dr. BURROWS mentions two chronic cases of melancholic insanity, in which the occurrence of salivation produced a cure. In mania, this effect is occasioned by mercury with greater difficulty than in melancholia. This writer states that he, subsequently to these cases, made many attempts to cure insanity by mercurial salivation; and that, although ptyalism was accomplished in several, yet he never succeeded, but in one case, to restore the mental functions; and this, also, was one of melancholia. Several instances of cure effected by salivation have been recorded by authors; still, I believe that mercury, exhibited to the extent necessary to produce this effect, — and especially when it fails of causing it, — is quite as likely to be as injurious as beneficial — to cause partial insanity, melancholia, and mania, to lapse into dementia or imbecility, — particularly in weak, susceptible, and irritable constitutions. We know, from numerous cases (and several have been observed by me), that the injudicious or excessive use of mercurials will sometimes occasion partial and melancholic insanity, — a circumstance which should, in some manner, influence our practice. Unfortunately, we know nothing of the symptoms, or of the modifications, of insanity, which indicate a

probable advantage from mercurial salivation. The most likely conditions are mania or melancholia consequent upon apoplexy, or complicated with hepatic disease. Mercurials, and particularly salivation, are most likely to prove injurious in every form of insanity which has been occasioned by depressing moral, or by exhausting physical, causes, — and especially by prolonged anxiety, or by masturbation. The bichloride of mercury, however, used in minute doses, as an alterative, in conjunction with tonics, is sometimes of service in several forms of mental disorder, and particularly in scrofulous constitutions.

471. *F. Soporifics.— a. Sleep, &c.*—It has been supposed that it is indispensable to procure sleep, — particularly when watchfulness is protracted; and that relief will generally follow it, when obtained. But sleep is not always much required; and is not even generally followed by relief, although it frequently is. In the early, or even incipient, states of mental disorder, topical bleeding, shaving the head, cold applied to the scalp, and purgatives, are the best means of producing repose; and others, especially narcotics, are then generally injurious: but, in more chronic cases, and where there is obvious exhaustion, consequent upon depletion and evacuations; or a state of great susceptibility and irritability, or of vascular inanition, generally, or locally as respects the brain; appropriate means of procuring sleep, and the use of narcotics, in suitable combinations, are most requisite. Various modes of producing a soporific effect, in mental disorders, have been advised, and very often with little attention to the pathological conditions for which they are severally suited. A few of these have been just mentioned; and others, especially refrigeration of the scalp, swinging, gyration, diet, certain positions of the patient's head, narcotics, &c., have been also recommended, with a view to this effect. It is often more beneficial to procure repose by other, and more indirect, means, than by narcotics; but several of these may be more dangerous than the latter, if empirically prescribed, as they too frequently have been.

472. *Swinging* seems to have been used by CELSUS and CÆLIUS AURELIANUS, to procure sleep; and its influence, in a limited form, is shown, by the rocking of a cradle, on children, and by the motion of a boat or vessel, at sea, upon both children and adults. It obviously affects the circulation, especially that of the brain; and, indirectly, both the stomach and the cutaneous circulation. *Horizontal gyration* was advised by DARWIN, and both it and *swinging* were practised by Dr. COX, in mental disorders. Dr. HALLARAN, also, adopted both these means, in the Cork Lunatic Asylum, and coincided with Dr. COX as to their utility. They employed two machines, or rather modifications of the rotatory machine: one, in which the patient was kept in a sitting position; the other, in which he was placed horizontally in a bed or crib. The former, or the *erect* machine, is described as seldom failing to produce copious evacuations in the most obstinate cases,—especially if, on increasing its velocity, the motion be suddenly reversed every six or eight minutes, pausing occasionally, and stopping its circulation suddenly. The effects are, an instant discharge of the contents of the stomach, bowels, and bladder, in quick succession. Should the stomach only be acted upon, a purge is recommended immediately afterwards. The *horizontal* modification of this machine, or circular bed, is employed for procuring sleep; the *erect*, for producing evacuations and moral repression. At *La Charité*, in Berlin, machines for both horizontal and perpendicular rotation were employed. VON HIRSCH recommended swinging in a hammock and various other modifications of this method have been advised.

473. Dr. BURROWS remarks, respecting these powerful means of treatment, that clear evacuation of the bowels should precede the use of either; and that they should not be employed early in the disease, until the violence of the attack has subsided; nor in young plethoric persons, nor where there is vascular determination to the head. The motions ought to be commenced gradually, till carried to the degree of velocity desired. When sleep is the object, a slow and continued action of the machine, without affecting the stomach, if possible, is necessary. When its full motion produces great prostration of strength, and lowers remarkably the circulation and animal temperature, advantage has been obtained from it. In the intermitting form of mania, it has sometimes checked the approaching paroxysm; and in the more continued cases, it has broken the catenation of morbid ideas; and the dread of being again placed upon it has often made the patient more manageable and alive to surrounding objects. Dr. PRICHARD states, that Dr. BOMPAS and Dr. DRAKE, of the Lunatic Asylum at York, have assured him that they consider the rotatory machine as a resource of great value in the treatment of madness. Although the opinions of these physicians, as well as of Dr. COX, Dr. HALLARAN, and some others, are in favour of the use of this machine in the treatment of insanity, yet it requires so much caution, and pathological observation and experience, to avoid the most dangerous consequences * from it, as to deserve the opinion already expressed respecting it (§ 440.).

474. Want of sleep, in some chronic cases of insanity, sometimes arises from inanition, consequent upon too low diet, and the abuse of evacuating and lowering remedies. In these, as well as in those cases of recent mania, occurring in delicate and nervous constitutions, and arising from a deficiency of blood generally, and possibly also locally in regard of the brain, a full diet, and malt liquor or wine in moderation, will prove the most serviceable soporifics. TUKE, BURROWS, and others have remarked, that noisy maniacs, who hardly ever sleep, by a change from a low to a full diet, especially after a full meal before going to bed, with the addition of a moderate quantity of porter, or even with porter alone, have often slept soundly, and ultimately recovered. It has been recommended to procure sleep by causing the patient to sleep with the head low: but this is a dangerous experiment, especially where there is vascular determination to the brain; and in such cases is sure not to succeed. Indeed, sleep in the

---

* Dr. HORN, of Berlin, remarks, that this powerful remedy should never be employed without great caution, and by experienced persons. Dr. BURROWS adds, that, notwithstanding his caution, a fatal accident occurred to one of his patients from its use, and created so great a popular clamour as to oblige him to retire from *La Charité*.

entirely recumbent position is seldom attended by benefit to maniacs. When, therefore, they can be persuaded to sleep in a semi-recumbent posture, it is to be preferred. The sitting position is generally better than the entirely horizontal; but, whatever may be the position, sleep will not afford relief, if the head be not kept cool by sufficiently refrigerating applications. The hop-pillow is sometimes of service, in the more nervous and irritable cases; but it is rarely of use when there is active vascular determination to the brain, — at least, not until this morbid state is removed. When much disorder of the stomach exists, alkalis and other antacids often assist in procuring repose, — especially when presented in conjunction with narcotics, and when the circumstances of the case warrant the use of these latter means. Very gentle friction of the head, prolonged combings of the hair, and gentle friction of the general surface, especially after a tepid or warm bath, have been followed by refreshing repose, in many of the nervous states of mental disorder, or in cases unattended by marked vascular excitement in the brain.

475. *G. Narcotics.* — *a. Opium and its preparations* have been prescribed in mental disorders by Cox, Odier, Brandreth, Chiaruggi, Doemling, Riel, and many others; whilst a few writers reprobate the practice. There can be no doubt of opiates being of great service when appropriately employed. They are not generally admissible, and they therefore require great discrimination in prescribing them. — I have already stated the pathological conditions and the previous treatment warranting a recourse to them in mania (§ 440.); and the same remarks apply to the employment of them in melancholia. In this latter affection, however, as well as in the more purely nervous states of mania and monomania, or when these are complicated with hysteria, it is often necessary to conjoin opiates with some restorative or antispasmodic, as camphor, valerian, ammonia, æther, &c. Opiates are less frequently useful in any of the forms of dementia than in these. M. Guislain justly remarks, that in cases of high excitement, strong full pulse, heat of skin, fulness of the vessels of the head, opium is injurious. It is most serviceable in delicate and attenuated persons of feeble constitution, and in those with cold relaxed skin, and frequent, small, weak pulse. If the disease has been of some duration, — if the circulation has been daily losing its force, — if there are only nervous symptoms to combat, — there can be no hesitation in giving opium. I may add, that it is especially indicated when restlessness, or prolonged want of sleep, has continued after sufficient evacuations have been procured; and still more so, if great exhaustion, tremor, cold perspirations, fits of violent delirium, and a very rapid and small pulse, supervene.

476. Still, much of the benefit that may be derived from opium will depend upon the selection of the preparation, the dose, and the mode of combining and of exhibiting it. The *acetate* and *muriate* of *morphia* are not so likely to disorder the head subsequently, as pure opium, or the simple tincture; and Battley's solution, or the black drop, may be preferred to the latter. When, however, opium, or its tincture, is given with aromatics, consequent disorder is more rarely produced by it. Van Swieten, Darwin, Kriebel, Brandreth, Currie, and others, record cases in which remarkably large quantities of opium have been given with advantage. But these are extreme cases, which merely show what may occur, but which should not guide our practice. It will generally be preferable, when the indications for the use of opium are conclusive, to prescribe it in a full dose at once; especially if the chief object be to procure sleep. In this case, from one and a half to three grains may be prescribed; or half a grain of the acetate or the muriate of morphia. If this dose fail, it may be repeated after six or eight hours; or even a somewhat larger dose may be taken. If a third dose produce no good result, it should be laid aside. In some cases, much smaller quantities may be prescribed with advantage, — especially when debility, exhaustion, or inanition of the vascular system, is great; but, in these circumstances, the opiate should be repeated somewhat more frequently, and be combined with aromatics, restoratives, antispasmodics, or tonics, according to circumstances. Dr. Burrows states, that where an anodyne has been required, he has begun with three grains of opium, and repeated one every two or three hours, — never in this way exceeding twelve grains; and that if sleep has not then followed, he has desisted.

477. The *combination* of opiates with other remedies thus becomes a matter of no small importance; and, indeed, much of the benefit opiates afford depends upon this circumstance. Friborg advises them to be prescribed with camphor and nitre; and Perfect, in nearly a similar form. There can be no doubt of the advantage often derivable from this and similar modes of exhibiting them. Where there is much determination of blood to the head, however, the camphor, unless in very small doses, may be injurious. But, if restlessness and watchfulness arise chiefly from exhaustion, inanition, or morbid nervous susceptibility, — if the disorder be chiefly or altogether nervous — be independent of increased vascular action in the brain, — this and similar combinations, and especially those with the preparations of valerian, of æther, of ammonia, assafœtida, musk, various aromatics, &c., will be most advantageous. In more doubtful circumstances, the combination of opium with ipecacuanha, soap, and a little capsicum, has proved beneficial in my practice. When hepatic derangement is present, or when some degree of vascular excitement still remains in the brain, opiates, conjoined with calomel and James's powder, is sometimes of use; but they should, even in this combination, be prescribed with caution and discrimination.

478. The question as to the employment of opium or morphia, in *enemata*, and *endermically*, is altogether subordinate to that respecting the circumstances in which this medicine is indicated. When these circumstances are clearly manifested, the usual mode of exhibition should be tried, at least, at first, — more especially as it admits of the combination of opiates with other remedies. But, when there is great difficulty in administering them by the mouth, or when they fail of affording the desired benefit, although obviously indicated, then the acetate or muriate of morphia may be sprinkled on a blistered surface, from which the cuticle has been removed; or any of the preparations of opium may be prescribed in enemata. Owing, however, to the occasionally rapid absorption of fluids from

the rectum and colon, a much smaller dose of opium should be exhibited in this than in the usual way. From ten to fifteen minims of the tincture may be administered every six hours. I have found the compound tincture of camphor and the syrup of poppies severally of use; from one to two drachms of the former, and from two to four drachms of the latter, being thus employed, but at different times, or in separate cases. When the patient awakens from sleep procured by the use of opiates, in a state of increased excitement, their exhibition should be relinquished.

479. *b. Hyoscyamus* has an advantage over opium, in neither constipating nor stupefying the patient. In order to obtain decided soporific effects from the extract, a dose of from ten to fifteen grains should be given at bedtime, or from a drachm to a drachm and a half of the tincture. It is apt to produce dryness of the mouth and fauces, and heat or irritation in the stomach; but it calms the circulation, and allays nervous susceptibility and irritation. It is very serviceable in cases characterised by morbid sensibility and irritability, and is much praised by Fothergill, Willis, Stoerck, Selig, Meyer, and Hufeland. Dr. Prichard does not consider it to be a remedy of great importance; whilst Dr. Burrows views it in a much more favourable light. The opinion of the latter physician accords more with my own experience. It is often of great service, when prescribed with camphor.

480. *c. Belladonna* has been recommended in mania by Theussinck, Vogel, Buchoz, Ludwig, Remer, Schmalz, and Hufeland. J. Franck advises it in mania complicated with epilepsy; and Müller prefers the powdered root to the extract, and gives it in gradually increased doses, until the pupil becomes dilated. It has been chiefly employed in the forms of extract and tincture in this country, and is favourably mentioned by Dr. Seymour and Dr. Burrows. Dr. Millingen states that he has found belladonna preferable to hyoscyamus or conium; and that the external employment of the extract, according to the endermic method, has been very effectual in reducing excitement, more especially when applied to the epigastric region. In the case of a female, to whom I was very recently called in consultation, and for whom the indications (§ 440. 475.) for narcotics and restoratives were very manifest, the following pills were prescribed with great benefit: —

No. 271. ℞ Extracti Belladonnæ gr. ij.; Camphoræ rasæ gr. xij.; Ammoniæ Carbon. gr. xij.; Pulv. Capsici gr. iij.; Pulv. Acaciæ et Balsami Peruviani q. s. ut fiant Pilulæ viij., quarum capiat duas, sextis horis.

481. *d. Stramonium* has been employed in mental disorders by Allioni, Maret, Stoerck, Remer, Reil, Greding, and Barton, chiefly in the form of extract and tincture. The vinous tincture of the seeds, made by infusing two ounces of the bruised seeds in eight ounces of Spanish wine, and one of alcohol, acording to most of the German Pharmacopœias, has been recommended by Schneider and Hufeland in doses of ten to twenty-five drops, twice or thrice daily. Dr. Burrows states, that one grain of the extract of stramonium has procured several hours' sleep in furious mania, when other narcotics, in considerable doses, had not succeeded; but the patients were much more violent when they awoke. This result too frequently follows the use both of stramonium and of belladonna. The effects of these narcotics, when given in considerable doses, should be carefully watched, and distinguished from the more unfavourable symptoms observed in mania. When dryness of the throat, dilatation of the pupils, anxiety, vertigo, convulsive movements of the extremities, &c., appear, as well as when mental excitement is increased by them, the employment of them should no longer be persisted in. — The extract and tincture of *aconite* have been prescribed by Durande and others; but it is a dangerous medicine in most forms of mental disorder. — *Conium* is less useful than hyoscyamus, and hence unnecessary.

482. *H. Sedatives. — a. Digitalis* has been praised as a remedy in mental disorders by Darwin, Ferriar, Currie, Fonzago, Jones, Müller, Guislain, Uwins, Burrows, Ellis, and others. Dr. Cox ranks it next to emetics; and thinks that its efficacy is attributable as much to the nausea it creates, when given in sufficient doses, as to its power over the circulation. Dr. Hallaran considers that, when it is given after the system is reduced by proper evacuations, and particularly by repeated purges of calomel, it is more to be trusted to than any other remedy. Besides its capability of restraining the heart's action, he supposes it to possess remarkable anodyne and soporific qualities in maniacal cases. He commences its use in doses of five or ten drops of the saturated tincture, thrice daily, and gradually increases the dose to fifty drops. Dr. Burrows remarks, that the propriety of lowering the system, by depletions and purgatives, before the exhibition of digitalis is begun, is confirmed by his own experience; and that he perfectly concurs with Dr. Hallaran in considering this medicine as having a very powerful influence in all the stages of insanity accompanied with great vascular excitement and a rapid pulse. Dr. Prichard observes, that the cases in which digitalis is most likely to be useful, are those attended by great arterial action, and high mental excitement. M. Foville considers that it is chiefly beneficial in those cases in which the mental affection is complicated with hypertrophy of the heart. I may remark, respecting this substance, that, when the large doses advised by Dr. Hallaran are given, the well-known effects of it should be carefully watched; and, as soon as they begin to appear, camphor, ammonia, æther, &c. should be had recourse to, and its use relinquished. Digitalis is useful, also, in other forms of the malady besides those particularised above, — and even in the low states of derangement, — when conjoined with camphor, ammonia, and other remedies. In these, as well as in other forms of the disorder, I have given it with great advantage in the following manner, after evacuations had been freely procured: —

No. 272. ℞ Camphoræ rasæ gr. iij.—v.; Pulv. Digitalis gr. ij.; Extr. Hyoscyami gr. vij.; Mucilag. Acaciæ q. s. M. Fiant Pilulæ iij., horâ somni sumendæ.

No. 273. ℞ Camphoræ rasæ gr. ij.; tere cum Mucilag. Acaciæ ʒj.; Aquæ Menthæ virid. ℥j.; Spirit. Ætheris Sulph. Comp. ʒj.; Tinct. Digitalis ♏ x.—xx.; Tinct. Hyoscyami ʒss. M. Fiat Haustus, bis terve in die sumendus. — Vel,

No. 274. ℞ Tinct. Digitalis ♏ x.—xx.; Tinct. Hyoscyami ʒss.; Spirit. Ammon. Arom. ʒss.; Liq. Ammoniæ Acetatis ʒij.; Mist. Camphoræ ℥j.; Syrupi Aurantii ʒss. M. Fiat Haustus, ter in die sumendus.

483. *b. Prussic acid and laurel water* have

been recommended as sedatives in various forms of insanity. The latter was advised by THILENIUS; the former, by Dr. SEYMOUR and Dr. BALMANNO. Dr. BURROWS states, that he made trial of prussic acid, but never derived permanent benefit from it in any one case.

484. *c. Tartar emetic*, in small and frequently repeated doses, in order to reduce vascular excitement in the brain, as well as in the system generally, was recommended by WILLICH, MÜLLER, BODEL, FRIZE, BURSERIUS, and BALDINGER. A combination of it with tartrate of potass, so as to act also upon the bowels, was advised by PIDERET, FORDYCE, and HUFELAND. Several writers have prescribed it so as to produce more or less continued nausea. Drs. COX and DE VOS, of Berlin, consider it of great service when vascular action is excited, and when the hæmorrhoidal or menstrual discharges have been suppressed, or the portal circulation obstructed. These are, indeed, the circumstances especially requiring it, whether existing in mania or monomania, and more especially in the sanguine or bilious temperament. Where there is more obvious vascular inanition or exhaustion, and in nervous and susceptible persons, a continued use of tartar emetic is injurious. The indications for, as well as against, this medicine, are nearly the same as those which relate to vascular depletions.

485. *d. Cold water*, drunk in large quantity, has been praised by LORRY, THEDEN, HILSCHER, and HUFELAND, in melancholia and mania. I have seen it beneficial in melancholia complicated with hysteria. AVENBRUGGER advised it in those cases especially which are attended by a desire to commit suicide. FALRET and GUISLAIN, however, observed no benefit accrue from it in such circumstances. It is probable that, in the very few cases in which it has proved useful, it has acted chiefly as a sedative of irritation in the digestive mucous surface and collatitious viscera, that has excited or perpetuated disorder of the cerebral functions. The remarkably large quantities of water taken almost hourly in most of these cases, may likewise have tended to remove obstructions from some one of the abdominal organs. — Cold water acidulated with the *vegetable acids*, and more especially with *vinegar*, was recommended by BUCHOZ, THEDEN, LOCHER, SELIG, and BANG, as a sedative and refrigerant of the vascular system; and in order further to promote this intention, small doses of *camphor*, or of *camphorated vinegar*, were advised by BONA, PERFECT, and others. — *Nitre* was also similarly employed, either alone, or with small doses of camphor, so as to secure the refrigerant and sedative effects of the latter. Cold water, medicated in either of these modes, and in the latter more particularly, or by the addition of the *spirits of nitric æther*, is more likely to be of service than when used simply. *Muriate of ammonia*, however, is preferable to nitre, in most cases, — inasmuch as it combines a tonic influence with its refrigerant and sedative properties. — *Acetate of lead* was likewise used by SCHRŒDER as a sedative and refrigerant in mental disorders attended by vascular excitement; but no notice has been taken of it in such circumstances by recent writers. In conjunction with vinegar and narcotics, it is as likely to be of service in these disorders, as in several others in which it has been lately employed. — The *biborate of soda*, and *boracic acid*, were also formerly employed in order to allay vascular action in connection with mental excitement. They have long fallen into disuse; but I have had reason to consider them as still deserving of notice.

486. *I. Stimulants* and *Antispasmodics* are especially indicated in nervous temperaments and delicate constitutions, or whenever the mental disorder appears in connection with deficient nervous or vital power, — when the head is cool, and the mental affection is independent of vascular fulness or action, — when sanguineous depletions and alvine evacuations have been carried sufficiently far, — or when exhaustion follows either these, or the previous excitement. In other circumstances, particularly if the scalp continue warmer than natural, or the carotids pulsate somewhat more strongly, these may still prove of service, if refrigerants be applied to the head; or they may be conjoined, in such circumstances, with sedative and diaphoretic medicines. Of stimulants and antispasmodics, the most frequently useful are, *camphor*, *valerian*, *ammonia*, *assafœtida*, *æther*, and *the compound spirit of æther*. Others have been employed, as the *oxides of bismuth* and *zinc*, *castor*, *serpentaria*, *arnica*, *electricity*, and *galvanism*.

487. *a. Camphor*, in the circumstances just specified (§ 486.), is a valuable remedy, and as such has been recognised by WHERLHOF, LOEBENSTEIN, KINNEIR, FISCHER, REMER, AVENBRUGGER, PERFECT, PERCIVAL, and HUFELAND. On the other hand, HASLAM, PRICHARD, and BURROWS esteem it of little value. Its influence in this, as well as in other diseases, is very different, according to the doses and combinations in which it is exhibited. Many years since, I entered upon a series of experiments, in order to ascertain its operation in different conditions of the system; and in a paper published some time afterwards (*Lond. Med. Repository*, for Sept. 1825, p. 245.), I stated the result of my researches, and of my experience of it in some cases of mania, which I had seen with Mr. ALCOCK, Mr. CARROLL, and others. Since then I have prescribed it in several cases, both of mania and melancholia, and, generally, with more or less benefit. Dr. MILLINGEN, in a work just published, forms a juster estimation of it than many other recent writers. He states it to be a valuable medicine, but requiring much discrimination. It is not advisable, he adds, when there is cerebral excitement, with a hot dry skin, full pulse, and wild countenance; but where there are much restlessness and uneasinesss, with a low weak pulse, or cold and clammy skin, it will be found most beneficial. This is altogether in accordance with what I have stated respecting it, in the paper just referred to. I have there shown, that camphor in very small doses is refrigerant; but in full or large doses it is restorative, exciting the brain and nervous system, and consecutively calming and anodyne. In mental disorders, it should not be employed until alvine evacuations, and sanguineous depletions, where these are required, have been duly employed. The combinations in which I have most frequently prescribed it, are with opium, morphia, or hyoscyamus, or belladonna, or with nitre, or with the solution of the acetate of ammonia, or with digitalis, or with JAMES's powder, or other antimonials, or with the alkaline carbonates, or with acetic acid, or with any two of these that may

be congruous with the circumstances of the case. Selig, Schoenheider, and Perfect prescribed camphor with vinegar, and Friborg, with nitre and opium, in maniacal cases. The dose of camphor in mental disorders, as well as the combination and mode of exhibiting it, ought to be regulated by the peculiarities of the case, and the effects of the previous treatment. M. Esquirol usually directs from half a drachm to a drachm to be dissolved in two ounces of vinegar, or dilute acetic acid, and given in an aromatic infusion in the course of the twenty-four hours. I have found this mode very serviceable in puerperal and hysterical mania,— other appropriate means being also employed,—but smaller doses are more appropriate in many cases. Cold applications to the head, the shower bath, or tepid bath, &c. may also be resorted to during its use, or when increased heat of the scalp or skin is caused by it.

488. *b.* The *infusion* and *compound tincture of valerian* have proved, in some cases of mania and of monomania, or melancholia, in which I have employed them, of great service — more especially in the states of these disorders already described (§ 486.). When these affections are associated with hysterical symptoms, or when the patient entertains the idea of committing suicide, or has a disposition to indulge or to adopt any dangerous caprice, these preparations are often beneficial,—particularly after appropriate evacuations, and in combination with the solution of acetate of ammonia, or with the alkaline carbonates, or with digitalis, hyoscyamus, &c. — *Musk* has been advised in similar circumstances by Thilenius, Locher, Selig, Pargeter, and Gmelin; but it, and *castor*, *ammonia*, *assafœtida*, the *oxides* of *bismuth* and *zinc*, and the *æthers*, are severally inferior to either camphor or valerian : yet they are often useful, especially as adjuncts to other stimulants and restoratives, or to narcotics or sedatives, or even to tonics, in the more strictly nervous forms of insanity, and in cases of debility and exhaustion.

489. *K. Tonics* were recommended by Sydenham, Selig, and Wintringham; and are obviously required in most of the circumstances in which stimulants and antispasmodics are indicated, and particularly in cases manifesting more or less of vascular inanition. — *a. Cinchona* or the *sulphate of quinine* — the latter especially — is often preferable to other tonics, more particularly in the intermittent forms of insanity. The infusion of bark with the solution of the acetate of ammonia is most suitable when vasaular or nervous excitement is passing into exhaustion, or in cases where the propriety of having recourse to tonics may seem doubtful. In circumstances of obvious exhaustion, or inanition ; in the more purely nervous states of disorder; in advanced stages, after evacuations have been carried sufficiently far, or when the head is cool, and the pulsations of the carotid are not increased in strength or fulness ; the sulphate of quinine, either alone, or with camphor, and with the extract of aloes if the bowels require to be kept freely open, will often be of service. I have given the following pills, varied with circumstances, in several cases of partial and general mental disorder; — the first, when the bowels are costive ; the second, when they are too relaxed. In this latter state, a combination of cinchona and opium was recommended by Ferriar.

No. 275. ℞ Quinæ Disulphatis ʒss. ; Camphoræ rasæ ℈ij.; Extr. Aloës purif. ʒss.—℈ij.; Extr. Hyoscyami ʒjss. ; Balsami Peruviani q. s. M. Fiant Pilulæ L., quarum capiat tres, bis terve in die.—Vel,

No. 276. ℞ Quinæ Disulphatis ℈j. ; Camphoræ ʒss.; Extr. Humuli ʒjss. (vel Pilulæ Saponis cum Opio ʒj.) ; Syrupi Simp. q. s. M. Fiant Pilulæ xxxvj., quarum capiat duas, vel tres, bis in die.

490. *b.* The *arsenical solution* has been prescribed by Neumann, Winckler, Ackermann, and Seymour ; and, in states and circumstances of the disease for which I have advised the sulphate of quinine, — and especially in the intermittent forms of insanity, — is well calculated to be of service. It requires not only great discrimination in entering upon the use of it, but also caution as to the quantity prescribed, and the continuance of a course of it ; as excess in either may be followed by inflammatory irritation of the digestive mucous surface — especially in the large intestines ; or by endocarditis.

491. *c.* The *nitrate of silver* has been recommended by Agricola and Kesler ; and, in circumstances truly indicating the propriety of tonics, and when insanity has been occasioned by depressing or exhausting causes, and in purely nervous cases, it may prove of service. It has been considered as more particularly suited to the complications of mental disorders with epilepsy. When, however, this association is dependent upon vascular or structural disease of the encephalon, little or no benefit can result from it. I prescribed it lately in one case of this kind; but was obliged to discontinue it. I have, however, found it of service in two cases of melancholia, with chronic irritation of the digestive mucous surface.

492. *d.* The *infusion* and *tincture of hop* have been recommended by Dr. Mayo ; and, in the numerous circumstances and cases of the disease requiring both tonic and anodyne remedies, they are appropriate, and likely to prove serviceable. They, moreover, admit of various useful combinations with other remedies in mental disorders.— The *preparations of iron*, and chalybeate mineral waters, have been employed by Lange and others. They are beneficial in several states of mental disorder, — and especially in the more purely nervous cases, and in states of vascular inanition, — or when derangement has proceeded chiefly from masturbation, or exhausting discharges. — The *sulphate of copper* has been prescribed by Boerhaave and Currie. It is suitable chiefly in diarrhœa occurring in chronic mania, and dementia. — *Absinthium* was used by Aretæus and Paulus Ægineta ; and the *muriate of baryta*, by Hufeland.

493. *e.* Various other *stimulants and tonics* have been recommended by writers on mental affections; but very few of these require particular notice.—*Phosphorus* is mentioned by Loebel and Kamer. Its powerfully stimulant qualities require great caution in its use. Formulæ for exhibiting it are to be found in the *Appendix* (F. 6. 7. 428.).—The extract of *nux vomica* is noticed by Murray and others: it also requires great discrimination in employing it (see F. 541, 542.). Both these substances are suitable only in the more nervous forms of mental disorder, — especially in melancholia, and dementia, proceeding from exhausting and depressing causes ; and in the circumstances indicating the adoption of the more energetic stimulants, and of chalybeates. In dementia and chronic mania complicated with

general palsy (§ 167.), these medicines may be tried, upon the principle adopted by CELSUS — "*Melius est anceps remedium, quam nullum.*" — The *chelidonium* was prescribed by MÜLLER, on account of its stimulant, laxative, and diuretic properties. As it promotes the secreting and excreting functions, and thereby exerts a deobstruent and alterative influence, it may be tried in mental disorders complicated with obstructions or other diseases of the abdominal viscera, — and especially in melancholia. — The decoction of *hypericum* was praised by MEYER and others. It is nervine and stimulant, and is most appropriate in the more purely nervous states of mental affection, and in melancholia, after sufficient alvine evacuations. Dr. MAYO observes, that the use of restoratives and tonics in the first stage of insanity is valuable in the nervous and serous states, but mischievous in the bilious and sanguine; and that, in the stage of exhaustion, they are required in every temperament.

494. *L. External Irritants* and *Derivatives* have been long and generally recommended in the treatment of mental affections. They may be divided into — 1st, *Irritants applied to the scalp*; and, 2d, *Irritants applied to parts more or less remote from the head*, so as to produce some degree of revulsion or derivation from the seat of morbid action. — *a. Scarifications of the scalp* were advised by ARETÆUS, CÆLIUS AURELIANUS, WALTHER, and PRICHARD; but they are admissible only when the scalp and head are more or less congested, or when inflammatory irritation or structural change is inferred to exist in the encephalon. In nervous and susceptible persons, and in states of general or local inanition of the vascular system, they may prove injurious. The application of the *actual cautery* to the occiput, or of *moxas* in the same situation, as advised by PASCAL, LARREY, and VALENTINE; and artificial *ulceration* of, or *setons* or *issues* inserted in, the scalp, as prescribed by HORN and others; are indicated and contra-indicated by the pathological conditions just mentioned. Inunction of the tartarised antimonial ointment on the shaved scalp, until a copious eruption of pustules is produced, was advised by MONRO, AUTENRIETH, JENNER, GUMPRECHT, and others; and has been found of service in some cases of mania, — especially when the acute stage is beginning to decline, or to pass into the chronic state. — The application of *blisters to the head* was recommended by THILENIUS, DÜRR, and HUFELAND. The practice is not without hazard, particularly in the more acute states of mental disorder. It is more appriate in the more chronic and low forms of derangement, and especially in imbecility and dementia.

495. *b.* The application of irritants so as to produce a *derivative* or *revulsive effect* is appropriate in many of the more acute and early, as well as in the more chronic, states of mental disorder; and yet, in very irritable, nervous, and susceptible patients, in the early stage of mania, and in cases where the vascular system is rather deficient, than too full, of blood, these irritants often increase disorder, by exciting the general sensibility. Where, however, the disorder has been consequent upon the suppression of accustomed eruptions, ulcerations, and discharges; and in many cases of melancholia, or of other forms of monomania; derivatives and revulsants are often of much service. In the more acute and recent cases, and especially of mania, they should not be resorted to until vascular depletions and other evacuations have been employed.

496. Various *modes* of producing derivation of disorder from the brain have been recommended. Several of these are already noticed, as also falling under other heads, — especially purgatives, warm bathing, &c. — *Blisters* on the nape of the neck, or on the legs, &c., are often resorted to; but they are seldom of service in mania, — especially in the early stages. They are useful chiefly in the states of disorder just mentioned. GUISLAIN recommends them to the nape, back, or insides of the thighs or legs, when insanity commences with depression of mind or melancholia, and in some states of dementia; but he has rarely found them serviceable in this latter state. AVENBRUGGER applies them to the region of the spleen, in melancholia; and, when prescribed either to the epigastrium or to the hypochondria, they are sometimes of service in that affection. More advantage may be expected from *issues* and *setons* than from blisters, unless the latter be kept open for a considerable time. ZACUTUS LUSITANUS advised setons or issues to be inserted over the region of the liver or spleen in melancholia. In the majority of cases, however, their insertion in the nape of the neck is preferable, — especially in the other forms of insanity. — *Dry cupping* in this situation is often of service. Dr. BURROWS suggests the application of the cups as a derivative to the shaved scalp itself; and, doubtless, this place will often be preferable. I have, in some instances, caused the nurse or attendant to resort to dry cupping on the nape several times in the day, and to employ merely a large glass, tumbler, or any other convenient article, for this purpose, and a piece of lighted paper.

497. The production of *irritation*, or *artificial eruptions* on parts of the body still more distant from the brain, or on the surface generally, has been advised, in order to remove irritation from this organ. They are commonly produced by the *tartarised antimonial ointment*, and by *frictions* with *croton oil*. THILENIUS, ODIER, MUZELL, and BARTHOLOMEW recommend *inoculation of the itch*. Besides these, warm mustard *pediluvia*, *mustard poultices* applied to distant parts, and particularly to the lower extremities, the hot *turpentine embrocation* in situations remote from the brain, and *irritating* or *cathartic enemata*, may severally be employed, in circumstances which seem to require them, — and especially when a tendency to coma or lethargy is observed.

498. *c.* Of the various *modes* of external irritation, Dr. BURROWS and Dr. MÜLLER consider *pustulation* by means of the tartarised antimonial ointment or plaster, the best; and they prefer the application of it to the shaved scalp. Dr. MILLINGEN prescribes it to the back of the neck. The choice of situation should depend upon the form and stage of disorder. In dementia, in cases attended by stupor or impaired sensibility, and when melancholia or mental depression is threatening to pass into excitement, the scalp may be preferred, after due evacuations have been procured. In some states of mania or monomania, this ointment or plaster may be applied to other

parts. M. **GUISLAIN** states that he has derived little advantage from it in dementia; but that he has sometimes found it of service in melancholia and in mania. Dr. **JENNER** published several instances of its success, when applied to the epigastric region, nape of the neck, scalp, and other situations. During the eruption thus produced, a restorative treatment is often necessary.

499. The insertion of *setons* in the neck is considered by Dr. **PRICHARD** to be most advisable in mental disorders of a chronic form; but he also recommends *issues* made by a long incision in the scalp, over the sagittal suture, where there is great intensity of disease, and a state of the brain threatening a fatal increase. In cases of stupor, and of dementia following apoplexy or palsy, or severe fevers, he believes this method more beneficial than any other. He also suggests a recourse to it in the complication of insanity with general palsy.—M. **ESQUIROL** remarks, that *dry cuppings*, blisters, and irritating applications are most successful in cases consequent upon metastasis, in monomania attended by stupor, and in dementia uncomplicated with convulsions or paralysis. There can be no doubt of *counter-irritation* being more appropriate in cases characterised by torpor and insensibility, instead of morbid activity or excitement and intensity of feeling. Dr. **PRICHARD** observes, that, in almost every case of paralysis, with a tendency to coma and lethargy, in which he has used this class of remedies, he has witnessed decided advantage from them. The opinions of Dr. N. **HILL**, M. **GUISLAIN**, and of Dr. **MAYO**, are also in favour of these means.

500. iii. **MORAL TREATMENT.** — Recourse to moral management has either been too much neglected, or too exclusively adopted. It is but seldom that the truly philosophic physician is satisfied, even in the present day, that physical treatment is duly associated with moral management; or that either, or both, are appropriately directed to the removal of existing pathological conditions, and of the associated mental disturbance. Yet both physical and moral means should be judiciously conjoined and directed to the peculiar circumstances of each case. — It is impossible, especially in my confined limits, to describe the impressions which should be produced, and feelings excited, in order to combat the various states of mental disorder that come before the physician. These means, to be appropriate and beneficial, must necessarily vary in each instance, and be so entirely based upon the ever varying phases of disorder, as not to admit of description. Yet much useful information on this subject, and even the principles of moral management, will be found in the writings of Sir H. **HALFORD**, Dr. **MAYO**, Dr. **PRICHARD**, Dr. **BURROWS**, MM. **GUISLAIN** and **ESQUIROL**.

501. *a*. It is chiefly at the commencement of mental disorder, and when the stage of excitement is about to lapse into comparative calm, that moral treatment is most beneficial. Still it should not be neglected at any period, as long as the patient retains any power of comprehension. Dr. **MAYO** observes, that, supposing the morbid state to be commencing, every effort must be made to strengthen the influence of the will. The patient, at this period, gradually surrenders himself — though not without a struggle — to some prevailing idea, fear, or delusion: he supposes his friends to be conspiring against him, or insulting or watching him; or he believes calamities of various kinds impending over him. Meanwhile he is struggling against the morbid impression. His efforts, therefore, whether manifest or not, must be aided when right, and his mind tranquillised. His fears should be shown to be unfounded, and his hopes excited and encouraged. To administer this aid is generally a matter of difficulty. The danger of mischief to himself or others, as well as the occasional necessity of repression, dictates *surveillance* (which is always irksome and distasteful), when it is most requisite to conciliate regard.

502. In this state of commencing or impending insanity, the morbid sensations or perceptions, and the unreal ideas or assertions of the patient, should not be rudely contradicted, and imputed to imagination. They are *real to him;* and to controvert them, is the readiest way to irritate the mind, to destroy all his confidence in the judgment and friendship of his adviser, and to strengthen and confirm the disease. His mind requires to be soothed, diverted, and abstracted from the fears and anxieties, by which it is absorbed, depressed, and exhausted. He should be told, that his feelings and perceptions will soon change, as his health improves: he should be comforted by admitting the justness of his complaints, and cheered by attributing them to a temporary disorder of his general health, which will be removed by suitable remedies; and these remedies ought always to be resorted to, in order, both that such disorder, which is never absent, may be cured, and that his confidence may be gained. At the same time, that such admissions are made, and that the utmost kindness and encouragement are evinced, the greatest firmness must be exercised: nothing should be yielded, that ought not to be conceded. He will thus be brought to look for support, and to trust to it, against his own instability and weakness of purpose, as well as for aid in his struggles against morbid impulses and desires. In this incipient stage of mental disorder, much consequent mischief may be prevented by judicious moral management,— by moral and religious consolations, mental abstraction, and diversion; by firmness, kindness, and moral control; by change of occupation, of scene, and of air; by travelling or voyaging; and by the amusements and intellectual *agrémens* of society. Foreign travel is generally preferred in these cases, as affording greater novelty; and visiting watering places, and mineral springs, in connection with travelling, presents several advantages. These conspire, with other circumstances, to excite, or to preserve hope, at the same time that they may be beneficially directed to the removal of physical disorder. At this period, nervous power is depressed by the continued operation of debilitating fears and sensations, whilst the assimilating, secreting, and excreting functions are impaired; and, hence, recourse to chalybeate, sulphureous, or saline waters, or to various combinations of these, in conjunction with moral influences, is frequently of the greatest benefit, — especially in the hypochondriacal and melancholic state of disorder. In addition to these, regular *exercise* in the open air, — particularly walking and riding, — and, still more, exercise and occupations which interest the

thoughts and engage the feelings in an agreeable manner,— as tennis, cricket, fishing, shooting, hunting, gardening, farming, &c. — should be enjoyed, with due precautions against injurious physical agents. The patient should almost altogether live in the open air; but the air should be dry and temperate, and the situation elevated. In unfavourable weather, in-door exercise and occupations should not be neglected. Amusements, also, may be often permitted, especially billiards, chess, backgammon, &c.

503. *b.* Even in the more *violent mental explosions* observed in mania, or when intense *reaction* follows upon depression or melancholia, moral restraint and discipline is often of great service. The union of firmness with kindness, even in such circumstances, is not to be laid aside. As M. Pinel observes, the physician sustains, in these cases, the sentiment of his dignity, and the principles of a pure and enlightened philanthropy. He allows the maniacs all the liberty compatible with the safety of themselves and of others; conceals from them the means of constraint, which he is obliged to employ; and, treating them with indulgence, leads them to suppose that they are only submitting to the laws of necessity. M. Georget remarks, that active and incessant inspection must be exercised, particularly in an asylum, over both patients and attendants. Lunatics evincing a disposition to suicide, should never be a moment out of sight. It is often necessary to confine violent patients, and those who are addicted to indecent practices, with the strait waistcoat. The only measures of punishment, he adds, that should be practised, are the strait waistcoat, seclusion in a cell, the shower bath, and some occasional privations. Dr. Prichard justly observes, that all means of punishment and intimidation should be used as sparingly as possible, and be of the most harmless kind. Solitary confinement, and the strait waistcoat, are sufficient in ordinary cases. M. Foville has recourse to the cold shower bath, and to cold affusion on the head; the violent maniac being seized by a number of attendants, and subjected to the affusion until he becomes subdued. The circular swing has been used with a similar intention; and after it has been once used, a threat of its repetition is frequently sufficient; but the cold affusion is a safer remedy. When obstinate lunatics refuse to take food or medicine, persuasion should be first tried; and if it fail, threats and harmless punishments may be adopted. The stomach-pump may be had recourse to in these cases; the use of it on one occasion will generally prevent the necessity of again employing it.

504. M. Guislain justly remarks, that the physician ought, as much as possible, to abstain from saying or doing any thing before a lunatic, calculated to inspire fear or dread, or by which he might become an object of aversion, or lose the confidence of the patient. Some other person should appear to be the agent in all restraints or punishments that may be required; and the physician should be regarded as the protector of his patients, and the dispenser of kindnesses and indulgences.

505. *c.* When the *acute stage*, or the period of excitement, has passed, a calm usually follows; and, in this state of comparative composure, the morbid delusions adhere to the mind less pertinaciously. The patient himself often begins to doubt their reality; and his estranged affections seem disposed to return. The observations of Sir Henry Halford, on the moral treatment of this period, are particularly deserving of attention. "If, at this auspicious moment," observes this able physician and classical writer, "the intercourse of a discreet friend be permitted, it will cheer the patient's heart; while, by kindness and attention, the physician will easily get possession of his returning confidence, and *so* induce him to unbosom himself of the distempered notions which still continue to haunt him. These, although they be founded in palpable error, the physician will not combat, although he will take proper opportunities of hinting his doubts of their reality. He will never deceive his patient, but take pains to prevail upon him, whenever they recur, to refer them to his unbiassed and more practised judgment; and to be guided by that, rather than by his own, in estimating the correctness of such opinions. He will act, as it were, upon a system of education, and will aim thereby at confirming the spirits, and strengthening the mind of the convalescent: and as the discipline employed in youth encourages and enforces the predominance of reason over the passions, so will discreet converse assist in restoring reason to her seat, and in giving her back again her proper sway over wild impulses. He will engage the mind agreeably, by presenting to it new objects, and by recalling former pursuits to their wonted acceptance." "Had the patient, before he was ill," Sir H. Halford continues, "any favourite amusement of a harmless nature?—Was he fond of *music*, for instance? — Music, without exercising the attention severely, has the power, however, to fix it; therefore, with this 'sola voluptas solamenque mali,' — the only gratification, perhaps, of which he is capable at this period of his mental darkness,— he may be indulged immediately." "Or, had the patient, before he became insane, a predilection for any particular studies? — Would he take the counsel of Lord Bacon, and entertain such as fill the mind with splendid and illustrious objects, as histories, fables, and contemplations of nature? — Or, did he prefer mathematics? and can he now be prevailed upon to enter upon a course of such reading?—Plato has called mathematical demonstrations the purgatives of the soul, as being the most proper means to cleanse it from errors, and give it a relish for truth. Certainly, nothing more entirely bars the intrusion of thick-coming fancies, by occupying the whole mind, than mathematical studies." — Sir H. Halford states, that Dr. A—— became deranged, whilst practising physic in the country, and, after a separation from his family for some months, was advised to resume the study of Euclid, having dropped hints of his partiality to it. He did resume it with the happiest effect, and recovered at length so entirely as to commence business in London, and to practise until his death.

506. Experience has shown, that monomaniacs are injured by directing their attention, or by adverting in any way, to their illusions. It is, on the contrary, requisite to engage their minds as much as possible with very different subjects, and with external objects. Still authors have adduced instances of persons having been cured of their delusions by some deception. Thus M. Esquirol states, that a lunatic would not pass his urine, because he supposed that, by doing so, the

world would be subjected to a second deluge. He was at last prevailed upon by being told that the town was on fire, and that he could save it from the flames. But any advantage obtained in this manner, is generally only temporary. During convalescence, powerful impressions on the mind, even in connection with the patient's delusion, may rouse the patient, as if from a dream, and thus dispel the unreal impression. A female patient had taken the most violent dislike to her family; the tidings of the death of a son in a foreign country excited in her a desire to see her surviving children, and recalled all her parental affection, instantly sweeping from her mind her insane antipathies, and restoring her to right feeling and reason.—(*Rep. of Glasg. Asyl. &c.* for 1839.)

507. On this subject Dr. BURROWS remarks, that to reason with a lunatic is folly; to oppose or to deny his hallucinations is worse, because it is sure to exasperate: an impression on him can be made only by talking *at*, not *to*, him. He will often notice what is said to others, and apply much of it to his own situation or delusion. To endeavour to convince him, or to break the catenation of his morbid ideas, by trick, fraud, surprise, or terror, is always attended by hazard. The chances are very many that it will not succeed; and, if it fail, the case is thereby rendered more intractable. "The confidence of his patients," Dr. BURROWS adds, "is the sure basis of the physician's success. A cheerful, encouraging, and friendly address; kind, but firm manners; to be patient to bear, but cautiously prudent in answering; never making a promise that cannot safely be performed, and, when made, never to break it; to be vigilant and decided; prompt to control when necessary, and willing, but cautious, in removing it when once imposed;—these will always acquire the goodwill and respect of lunatics, and a command over them that will accomplish what force can never attain."

508. Moral management must necessarily vary with the states of the disease. In the more violent state, restraint and medical discipline should be applied until violence subsides. In the more passive states, restraint is never necessary, unless there be a propensity to suicide, or to a solitary vice which is so frequently a cause of, as well as often an attendant upon, the mental disorder. To prevent this latter propensity is extremely difficult; but various means may be had recourse to with advantage,—and these will readily suggest themselves.* Vigilance is necessary in all cases; for the passive may change in a moment to the active or violent state, and mischief may thus be done before it can be prevented.

509. *d. During convalescence* especially, moral treatment requires the greatest judgment and discrimination in all its relations. In this period, the dawnings of reason should be carefully observed and assisted, and every aid afforded to the struggling efforts of nature. The bodily disease is now loosening its hold over the mental powers; and these powers may be now aided in emancipating themselves from the morbid bondage. The suggestions, and occasionally the reasoning, of the physician advanced with kindness and sincerity, and in the soothing language of friendship, in this stage, often assist in removing weakened and decaying delusions. When convalescence approaches with a revival of the affections, the consolations of the physician are often requisite to calm the feelings which thus burst forth, and to guide them in right directions; or his encouragements are necessary to elicit them, and to give them permanency. Dr. BURROWS justly remarks, that if, in reasoning with the patient on any remaining delusion, a painful recollection is revived, the subject should be changed, and resumed at another time. If any domestic event have occurred, during the loss of the patient's reason, likely to excite a strong feeling of joy or of grief, it should be withheld until the mind has acquired strength to bear it; and even then caution in communicating it is requisite. One of the most important and delicate tasks, in communicating with a convalescent, as to the past and present, is to preserve a due medium between gratifying and checking his eager importunities for information. Too great a flood of reminiscences, called up by much information, may endanger the mind enfeebled by disease. The recollections of the past affect different minds very differently. With some, the retrospect is a perfect blank; others remember the past as a dream; others recollect all its realities. Some refer to the past with indifference; others advert to it with gratitude to those who contributed to their recovery; others recall it with pain and abhorrence, and avoid all reference to person, place, or circumstance connected with it. Whatever may be the impression on the mind of the patient, it should be carefully noted, and the conversation with him should conform to it.

510. *e. Religious consolation* is frequently of the greatest benefit in the partial and chronic forms of insanity, when judiciously resorted to. It has been, however, supposed by some to be injurious, or of doubtful advantage, because religion is sometimes a cause of the malady. But, as I have shown (§ 293.), it is only mistaken, unsettled, and fanatical views of Christian doctrines that occasion, in some instances, mental disorder; and, even in these cases, as well as in many others, the truths and consolations which true religion affords, may be made most efficacious means of cure, when judiciously placed before the mind of the patient, at a proper season, by the well-educated and sober-minded clergyman, and when the physician finds no circumstance contra-indicating the propriety of having recourse to them. Mr. TUKE very judiciously remarks, that the mild but powerful influence of the precepts of our holy religion, where these have been strongly imbued in early life, become little less than principles of our nature; and their restraining power is frequently felt, even under the delirious excitement of insanity. Before, however, religious consolation or instruction should be attempted, some information should be acquired of every patient's former and present opinions and

---

* Sir W. ELLIS recommends a pair of wide canvas sleeves, connected by a broad shoulder-strap, so as to rest easily on the shoulders. They ought to come up well on the shoulders, and to extend about an inch beyond the points of the fingers; the part covering the hand being made of stiff leather, to prevent the hand grasping any thing. They keep the arms hanging easily by the sides of the body. They are fastened at the back by two straps,—one going from one sleeve a little above the elbow, across the loins to a similar position in the other sleeve; a second lower down; and by three similar straps in the front, the latter being secured by buckles. This mode of restraint is less heating, and produces less pressure on the chest, than the common strait waistcoat.

state of mind: and then religion will often be most advantageously brought in aid of physical and moral treatment; and will tend not only to the restoration of the mental powers, but also to the preservation of them subsequently. The minister of religion, in order to be useful, should have free intercourse with the patient; and administer consolation, or remove doubts, rather by private communication, than by more public instruction or preaching. When the latter is attempted in an asylum, a judicious selection ought to be made of the patients, and the discourse should be suited to their states, — to inspire hope and confidence, — carefully avoiding whatever may perplex the mind, or cause fear or alarm.

511. In a recent report of the Glasgow Asylum for Lunatics, it is stated that, in many instances, the personal and private, as well as public, ministrations of the chaplain have carried consolation and comfort to the minds of the patients, particularly those troubled with distressing apprehensions on religious subjects. The sermons delivered in the chapel are described as being adapted, as much as possible, to the peculiar circumstances of the audience; and as being the means of withdrawing their attention, for a time, from their prevailing illusions. Every thing that is conceived to have a tendency to agitate the mind is carefully avoided, and pains taken to present the most soothing and practical views of Divine truth. Two very important advantages are derived to the patients from the institution of public worship, — that of alleviating the malady under which they labour, and that of gratifying and strengthening those pious feelings from which they derive the greatest consolation.

512. *f. Employments and Amusements.— Exercise*, by equalising the circulation, by determining it to muscular structures and to the extremities, and by promoting the exhalations and secretions, is of great service in the partial and chronic states of insanity. But it must be varied according to circumstances, and to the previous habits, conditions, and occupations of the patients. Walking and riding in the open air, or long walks in fields and woods, in company with a suitable guardian, during as great a portion of the day as the strength of the patient will permit, are often of great service. All establishments for the insane ought to be provided with the means of affording to their inmates regular exercise and employment in the open air. They should also be constructed with galleries and covered courts, freely admitting the air, where the patients may take exercise in wet weather. Gardening and various agricultural occupations should engage a considerable portion of time, at stated periods of the day. In manufacturing districts, many lunatics may be made to follow, as a means of distracting their minds from their delusions, their several callings. In the *Salpêtrière*, the women are permitted to sell a part of the produce of their industry, and to apply it to the relief of their necessitous families. Females and men of sedentary habits should be engaged, as much as possible, in some regular occupation. In many asylums — especially abroad — the females are occupied in embroidery, in spinning, knitting, sewing, and various fancy works. Most lunatics are disinclined to work; but kind entreaties, or the prospect of procuring the means of extra comforts, will often tempt them to do something. Even in the early stages of dementia, it is not impossible to induce such patients to work at some merely mechanical occupation. Employments, suited to the previous habits and stations of the patients, mitigate the disease, and tend much to promote the recovery of curable cases. Where the taste and previous occupation of the patient leads to study or sedentary pursuits, these should not be indulged for too long a period without relaxation, or to the neglect of proper exercise in the open air. The greatest difficulty is to find employment or amusement for the higher classes of lunatics. They soon tire of the same pursuit. Reading, chess, cards, bagatelle, billiards, and other games, should be diversified with bowls, tennis, gardening, walking, cricket, and various athletic exercises.

513. *Music* has been considered useful by several writers, as a means of abstracting the attention of lunatics from disordered trains of thought. M. Guislain observes, that music is useful with reference — *first*, to those who play upon some instrument; and, *secondly*, to those who listen to it. It should also be viewed both as a means of beneficially exercising the mind, and as a mere amusement. Persons who can use a musical instrument, and those who are fond of music, will sometimes derive advantage from it; but it is doubtful whether or not it will afford any benefit to others. Dr. Prichard states, that Dr. Cox considered that some advantage was derived from it as an amusement; but, that it is of little importance in the treatment of insanity, is proved by the circumstance of Dr. Bompas, the successor of Dr. Cox in the asylum conducted by him, having discontinued it. M. Esquirol remarks, that he has very rarely obtained any advantage from music. It sometimes calms the spirits, but it exerts no curative influence; it may even render maniacs more furious. He, however, admits its beneficial influence during convalescence — particularly of those who have cultivated music, or who are fond of it. In the more lethargic or dull states of madness, in melancholia, and in other forms of partial insanity, it is often of service; whilst it may prove injurious in some cases of mania — more especially those characterised by a tendency to violent excitement. When the patient has been a performer, playing on his instrument is allowable, as innocently employing both mind and body.

514. *g. Visits of friends, and restoration to society.* — Convalescence is often checked, and the disorder reproduced, by the patient's impatience to be freed from all restraint; and the same effect is too often caused by the impatience and distrust of friends. During convalescence, the physician has not only, as Dr. Burrows observes, to encourage every dawning sign of returning reason, to employ the soothing language of friendship, and to calm the agony which reminiscence often generates, but also to repress impatience, and to contend with and remove the suspicion and want of confidence, which his cautious course usually produces in relations and friends, and which, if not steadily resisted, endanger the approaching recovery of his patient. The chief risks to which convalescence is exposed, are the *premature visits* of friends, and *removal* from the proper sphere of treatment, to an intercourse with relations and society, and with busi-

ness and its various contingent annoyances and distractions, before the action of the brain, and the manifestations of mind, have been sufficiently restored, or the restoration adequately confirmed. The difficulty of determining when friends should be admitted, and when the patient should be restored to society, is generally great; and the evils resulting from a too long seclusion are sometimes not much less than those which might accrue from premature intercourse. The experience and good sense of the physician will enable him to arrive at a just conclusion with reference to particular cases, — for no general rule on this subject can be laid down. When convinced that either measure will be detrimental, resistance should be carried to the utmost; or until importunity, on the part of those who have authority, assumes the form of *command*. "In yielding, contrary to his judgment, the physician should distinctly throw all responsibility on the applicant; otherwise, the consequence, if injurious, will certainly be cast on him." (BURROWS.) I would add, that the commands of the friends, in such circumstances, should be required to be made in writing; as they will be much more cautious than otherwise in thus making them, and as evasions of responsibility will often be attempted, in this as well as in many other matters, when there is no written document to prove its existence.

515. Before permitting the visit of any person, the state of the patient's feelings and views to that person should be ascertained. It will be also preferable to select for the first interview some one who the least interests the patient's affections; and, if this communication is borne without any ill effect, a nearer friend or relative may be selected, leaving the object of warmest attachment to the last. Proceeding in this cautious way, Dr. BURROWS remarks, the too sensitive or feeble mind is gradually brought to bear a renewal of intercourse without being too much moved. But the physician might be deceived by the dissimulation of the patient, who will often assume an appearance of amendment merely to obtain an interview with a friend; his only object in seeking it being to request his release, or to complain of his treatment.

516. Cunning being a characteristic of madness, the physician should always be upon his guard against being imposed upon. Many are fully aware that, if they can conceal their delusions, they may be considered well; and, when only one delusion is entertained, it is often difficult to detect it. Dr. BURROWS had a patient, whose specific delusion gave rise to outrageous conduct requiring her confinement; and yet this delusion was successfully concealed for nine months, — at the end of which time it was manifested in an alarming manner. In this, and similar cases, a recovery might have been prematurely or improperly pronounced. On the other hand, it is possible for an impression, made previously to complete mental derangement, to be so firmly retained after recovery, as to have the semblance of a delusion, and yet be none; especially when no recollection is retained of what has occurred between the accession of disorder and recovery, and when the patient reasons and acts upon this conviction, and reckons a circumstance long passed as having recently taken place. Much discrimination and experience are necessary to determine when seclusion may be terminated, and the patient restored to society. If the disorder have been caused by intemperance, a longer confinement after convalescence is required, than in other circumstances; for the longer it is protracted, the greater is the chance of the patient being induced to relinquish a recurrence to the cause.

517. *h. After the patient is restored to society*, moral and hygeienic management ought to be continued for a considerable period. Due care should be taken not to excite, or inordinately indulge, the passions and desires. Irritations of mind and body should be avoided; and all emotions which depress, equally with those which unduly stimulate the mind, ought to be evaded. Mental exertion is also injurious. The intellectual as well as the moral powers should not have too much imposed upon them. They ought, at first, to be only agreeably and gently exercised; and, as they re-acquire strength, more may be exacted from them. Travelling, agreeable society, change of scene and of air, regular and early hours of sleeping and dining, pleasant occupations, and exercise in the open air, are all of the most essential service after recovery. Of no less importance are regular and abstemious modes of living, and strict attention to the states of the digestive and excreting functions. In a word, the *predisposing* and *exciting causes* ought to be carefully avoided.

518. iv. CLASSIFICATION OF PATIENTS, AND ARRANGEMENT OF INSTITUTIONS, &c. — *A. The classification of the insane*, in both public and private asylums, is too frequently dependent upon their extent, and upon subordinate circumstances and arrangements; instead of these being made subservient to a classification, which may contribute to the safety and speedy recovery of the patients. It is difficult, and even not very requisite, were it easy, to state the classifications and arrangements which may be adopted in various circumstances. In these matters, as well as in the *organisation* and *management of these institutions*, medical knowledge, and an acquaintance with mental disorders, under the guidance of common sense, will generally enable the physician to arrive at judicious conclusions. But in all arrangements and modes of organisation, a due separation of the different classes of cases, and of convalescents, should be secured; and no asylum, public or private, should be allowed or licensed, that is not placed under the constant superintendence of a regularly educated and qualified medical practitioner, who should reside in it, and be in constant communication with its inmates. On this particular topic, much information will be obtained in many of the recent publications referred to in the *Bibliography* attached to this article. I can furnish only a brief abstract of what has been stated regarding it, by PINEL, ESQUIROL, and GEORGET.

519. *a. The classification* of lunatics is requisite, not merely for the purpose of separating such as are liable to injure themselves or others, but also with the view of permitting those to associate together, who may contribute to each other's cure. A lunatic asylum should be composed of several parts, more or less insulated. There ought to be a quarter for each sex; a division for the violent; a second for those who are tranquil; a third for those labouring under accidental disorders or complications; and a fourth for convalescents. It

is, above all, necessary to separate the sexes, the convalescents, and those who have depraved habits, and indecent manners. Divisions should also be allotted for those of melancholy feelings; for those in a state of imbecility or dementia; for the noisy and furious; and for those who are untameable, or are confined by way of punishment. It would be preferable for each division to have a court planted with trees, and a garden for the patients to walk in.

520. *b.* It is further requisite, for the convenience and safety of the patients, and to facilitate vigilant superintendence and protection, that an asylum should be built on level or slightly elevated ground; — that the cells for violent patients should be spacious, with a door and window opposite each other, and opening from without; — that they should be boarded, and not paved; furnished with a bed firmly fixed in the wall; — that all the cells should communicate with covered galleries or corridors, in which the patients may walk in bad weather, and by means of which the inspectors and servants may easily pass to different parts of the building; — that all the rooms should be warmed by pipes conveying hot water in preference to hot air; — that water should be abundantly supplied; — that the privies should be arranged so as to occasion no inconvenience to the patients; — and that there should be places appointed for a general work-room, for a common dining room, for baths, shower baths, and douches. — There should be suitable dormitories for convalescents, melancholic patients, idiots, and those who are debilitated. For others, little cells with one bed are preferable; the patients going out of them in the day-time, and associating with one another, — no companions being allowed in the night.

521. *B. The selection of the inspectors and attendants* in lunatic institutions is of great importance. Insane persons look upon the attendants as accomplices in the power which has deprived them of liberty and as inhuman jailers, view them with suspicion and hatred, and even abuse and strike them. It is often difficult to make servants understand the states of those committed to their care, so as to enable them to preserve their temper, and to act with kindness and firmness in all circumstances; and it is not easy to convince them, that the insane have the use of some of their faculties, and are often quick, observant, and cunning. Those attendants, who have been themselves insane, are generally the most careful, forbearing, and kind to those over whom they are placed. M. Esquirol has a favourable opinion of convalescents as keepers: they are compassionate to the infirmities which they have themselves so recently suffered; they aid the physician more efficiently; and their examples are encouraging to others. The attendants ought always to be sufficiently numerous, — one attendant to from eight to twelve male patients, and one to from ten to fifteen females, according to circumstances. Old military men are amongst the best keepers; for, as Dr. Conolly remarks, they keep up their own authority, and are obedient to superior orders. The physician of a lunatic asylum ought to be careful to instruct those who are to have the management of the patients. It is absolutely requisite, that a judicious arrangement of authority and subordination be established in all asylums, and that the power of the physician should be superior to all, in respect of every thing that concerns the patients.

IX. Insanity, Connate; and Puerile Imbecility. — Syn. *Idiotcy, Natural Idiotism, Congenital Privation of Intellect, Puerile Imbecility, Weakness of Mind, Silliness, Stupidity, Connate Fatuity, Primary Fatuity, Idiotism, Mental Deficiency, Original Deficiency of Understanding; Stupiditas, Vecordia, Amentia, Imbecillitas Ingenii; Fatuitas; Amentia Congenita,* Sauvages, Sagar, Vogel; *Démence innée,* Fodéré; *Idiotisme,* Pinel; *Die Spracheigenheit, Blödsinn,* Germ.; *Idiotismo,* Ital.

522. Defin. — *Deficiency, or entire privation, of intellect, appearing during infancy and childhood, depending either upon an original defect, or upon an arrest of the developement of the mental faculties.*

523. *Puerile imbecility and idiotcy* may be considered as representing two grades of primary mental deficiency. The former is that state or degree in which there is an original impairment, but not an entire want, of intellect. The latter is a more complete grade of deficiency, sometimes amounting to an absence not only of the moral and intellectual manifestations, but also of the instincts necessary to self-preservation. Between, however, this, the highest degree of idiotcy, and the slightest state of intellectual deficiency, there is every intermediate grade. Original defect of intellect should not be confounded with the imbecility, or incoherency, or fatuity, consequent upon other forms of insanity, or upon cerebral diseases, — the *Amentia acquisita* of authors; nor with senile fatuity, imbecility, or dotage, — the *Amentia senilis.* The distinction has been very properly made by Esquirol and Prichard; and most succinctly and correctly stated by Dr. Klein Grant, under the article *Amentia,* in his edition of Hooper's *Medical Dictionary.* — Original deficiency and entire want of intellect may appear unconnected with any bodily disease — may be *simple* and *uncomplicated;* or they may be *associated with* other maladies — or *complicated.* Complete idiotcy, especially, may be further associated with congenital deficiency of some organ or part, or connected with malformation, or arrest of developement, of some portion of the brain, or organ of sense.

524. i. Deficiency of Intellect appears in every grade and form until it amounts to complete idiotcy. The slighter degrees of deficiency are manifested chiefly by weakness of character and capacity, or by stupidity or deficiency of the powers of perception, or of the understanding. These grades of defect are generally not sufficient to render an individual incompetent to the management of his affairs, or to conduct himself with propriety; and are hence not considered sufficient to constitute unsoundness of mind, in its legal acceptation. But as the original defect may present every grade, from the slightest of those just mentioned to complete idiotcy, it is difficult to draw any line of demarcation between what may be considered soundness or unsoundness of mind. This line must still remain unfixed, or at best be only conventional, for no standard or criterion can possibly be established. As in consecutive impairment, or disorder, of mind, so in original deficiency of intellect, there are every

shade and degree of mental manifestation, descending, from the highest state of perfection of the human understanding, down to the lowest state of privation of intellect and of instinct; there being no break in the scale, or in the continuity of declension.

525. Deficiency of intellect begins to appear from the *first* to the *eighth* or *ninth* year of age. When it is congenital, it may manifest itself even somewhat earlier than the former period. When it arises from an arrest of the developement of the mental faculties, owing to injury or physical disease, it may not be evinced until a later period than that assigned. In this latter case, the deficiency is seldom so great as when it occurs at earlier stages, or depends upon changes that have taken place in the encephalon either previous to, or soon after, birth.

526. From what has been already stated, it is obvious that all the grades and forms of original imbecility cannot be described within moderate limits. Nor is minute description at all requisite: the works of Georget and Esquirol will furnish it, and numerous illustrations of it. I may, however, briefly observe, that imbecile persons have a limited capacity for certain actions or employments, and acquire some degree of facility in performing them. These they generally execute in a tolerable manner, whilst they are quite incapable of any other modes of exertion or occupation. Habit has a great influence on all their proceedings, and gives to many of them an appearance of regularity which may be mistaken for the result of steadiness and of higher powers. All are, however, deficient in the powers of attention and thought. They are generally timorous, often docile, weak and inconstant in purpose, and frequently irascible. The senses of some give rise to feeble and dull impressions, — of others, to more lively perceptions. Memory is strong in some; whilst in others it is weak, confined in its range to the most ordinary objects and frequently repeated ideas, or it hardly exists. They display some indications of mind, of intellectual faculties, and of feelings and affections; and they have the use of speech and of language generally in a degree proportionate to the grade of perfection of their several senses and mental powers. They show the same varieties of character, inclination, and moral propensity, as persons of stronger understanding. Left to themselves, they are careless, lazy, and filthy. At the age of puberty, they evince the animal instincts by the most offensive gestures, habits, and solitary vices. Some become subject to paroxysms of capricious violence, to hysteria, to nymphomania, or satyriasis. Many are prone to lying, pilfering, and stealing. Several lapse into melancholia, or sink in a gradual decay of physical health — frequently owing to an uncontrollable addiction to masturbation. In other circumstances, they eat and digest well, and females have the catamenia regularly. Some imbecile persons evince signs of talent in particular pursuits, particularly in music and the ruder of the imitative arts. Others have retentive memories, learn languages, and are capable of other acquirements, while, in all other respects, they are deficient in any talent, and generally in mental power. They commonly present much of the character, in manner and in the developement of mind, of infants or children. They are deficient in affection, in application to any pursuit, in the powers of comprehension, of pursuing a train of ideas, and of entering into a rational or sustained conversation. They are without energy and steadiness, and are fearful and cowardly. They are incapable of reflecting, of contriving any thing, or of accomplishing any thing.

527. ii. Idiotcy. — *More or less complete privation of the mental faculties.*—This is the highest grade of original deficiency of intellect. In this state, the moral, the reflecting, and the intellectual manifestations are altogether wanting; and sometimes the instinctive emotions of mind are also partially or totally undeveloped. Indeed, the different states of idiotcy depend chiefly upon the extent of deficiency of this class of the mental powers. Those instinctive feelings and desires, which are the most generally bestowed on the animal creation, and which especially subserve the preservation of the individual and of the species (see *Classif.* in note to § 66.), are chiefly present, — frequently in an inordinate degree, — and are deficient only in the most extreme cases. Infants that become idiots have large or ill-formed heads, imperfect features, take the breast with difficulty, are long before their eyes follow the light, and often squint. They are puny, lean, of bad complexion, have a feeble physical developement and vital endowment, are incapable of instruction, cannot learn to walk until they are six or eight years of age, or sometimes till they attain the age of puberty. They articulate imperfectly, or learn but a few words, or are altogether incapable of articulate sounds, although they may possess the sense of hearing. When the head is very small or very large, or flattened in any direction, or much deformed, death generally takes place early, — generally long before puberty, or at any age between this epoch and the first months of existence.

528. *Idiots*, both children and adults, present not only these deformities, but all those described in the article Cranium. Their features are irregular and repulsive; their eyes are blinking, and deeply set; their lips are large, thick, flaccid, and relaxed; their mouths are gaping, and admit of a drivelling of the saliva; their organs of sense are imperfect — they see and hear imperfectly, or are entirely deaf and dumb. Their taste and smell are also deficient, and they eat without selection of food. If speech exist at all, it is extremely limited, and drawling or lisping, and capable of expressing only the most urgent physical wants. Their chests are narrow or contracted; their limbs ill-formed; and their gait, as well as all their movements and attempts at muscular exertion, unsteady and awkward. They are sometimes club-footed, and the muscles of the arms or legs contracted. They are commonly rachitic, or scrofulous, — often partially or generally paralytic, or subject to epileptic fits. Not only are they without the reflecting and intellectual faculties, but even their sensibility is deficient; and sensation, when excited, is scarcely followed by perception of objects or ideas. They are incapable of directing their attention to any thing. Owing to the defective state of their instinctive feelings, they appear far below the brutes in the scale of animal existence; and, as M. Esquirol remarks, are monsters or imperfect beings, who are destined to a speedy extinction, if the tenderness of parents, or the

compassion of others, did not prolong their existence. Yet idiots have the bodily appetites, and sexual desires, — sometimes in an inordinate degree, and repulsive manner. They often exhibit signs of premature puberty, and are generally addicted to masturbation. They are often, also, subject to anger and rage. Some display faint glimmerings of intelligence, when their notice is excited by strong impressions on their senses. They then appear to look at certain things with a vague expression of pleasure, or of curiosity: they seem to desire some objects, particularly articles of food: they occasionally indicate, by gestures or cries, objects of desire or aversion, or the pleasure or pain which they feel: they come to know the persons who habitually take care of them; but they are incapable of dressing or undressing themselves, or of the common acts of cleanliness. Others are debased to the lowest state of being, — are sometimes even unconscious of their evacuations, and incapable of commanding or restraining them; and enjoy only a vegetative existence, devoid of sensation and sensibility. Idiots of a higher grade of developement are capable of moving from place to place; but are, like machines, made to repeat the same movements: they move their arms, as if to facilitate progression; laugh mechanically; utter inarticulate sounds, as if to amuse themselves; occasionally catch a few notes of a simple tune, which they constantly repeat; and become attached to particular places and positions.

529. iii. The Complications of imbecility and idiotcy are chiefly those already noticed (§ 523. 528.), more particularly rickets, scrofula, general or partial palsy, epilepsy, contractions and malformations of the extremities, deficiencies of the organs of sense, goître, and, still more particularly, Cretinism, which, in its fully developed states, is always associated with more or less absolute want of the mental powers. (See art. Cretinism.)

530. iv. The Causes of imbecility and idiotcy are of importance, both in a medical and in a social point of view. — *A. The remote causes* are — 1st, Those which are referable to the parents, and which operate previously to birth; — 2dly, Those which more especially belong to the patient, and which affect him subsequently to birth. — *a. The causes which operate previously to birth* are — whatever exhausts or debilitates the parents, or renders the reproductive acts imperfect*, — as habitual debauchery, solitary vices, and drunkenness; sexual debility, or states approaching to impotency; the insalubrity of certain localities, particularly those observed to produce *cretinism* (§ 6.); the scrofulous and rickety diathesis; and the advanced age or debility of one or both parents. Esquirol states, that idiotcy is more common in the country — especially in mountainous districts — than in towns. He, as well as numerous other writers, insists upon the influence of violent mental emotions, and moral shocks during the early or middle months of utero-gestation. Several modern writers have affected to doubt this cause; and, as they cannot dispute the frequent occurrence of arrest of developement of the nervous system, and congenital deficiency of mental manifestations, in the children whose mothers had been thus affected during the period of their fœtal existence, yet consider the phenomena in no way connected — as coincidences merely, — and as holding no relation of cause and effect. The vulgar opinion, however, of this matter is nearer the truth; and the evidence of the arrest of developement having been produced by the mental, and the consequent physical, shock of the mother during gestation, is much more conclusive than most of the evidence usually furnished us in physiological and practical researches, or than that upon which we are constantly acting in the discharge of our professional duties. It by no means follows, that the phenomena which we cannot satisfactorily explain, should therefore not exist; or that relations, of which we cannot trace the connection conclusively, are on this account altogether wanting. Yet even here, however difficult may be the explanation, or apparently loose the connection, both the one and the other may be furnished conformably with views stated in this and other articles. It is not improbable even, that the means sometimes used to conceal pregnancy, or to procure abortion, may so affect the developement of the fœtus as to produce idiotcy. The same causes which occasion congenital and chronic Dropsy *of the Brain* (§ 283. *et seq.*), will sometimes cause more or less complete deficiency of the mental faculties. Inflammation, or tubercular disease, of the brain or of its membranes, during fœtal existence, will disturb or arrest the subsequent developement of these parts, and of their respective manifestations. Injuries of the head of the fœtus, sustained during parturition, have also produced this effect.

531. *b. The causes which operate after birth* are, chiefly, injuries of the head; diseases of the brain — particularly acute and chronic hydrocephalus; inflammations of the brain or of its membranes; convulsions; dentition; exanthematous fevers — especially when attended by cerebral affections; tubercular disease, with or without inflammation, of the encephalon; remarkable precocity in connection with a susceptible and irritable state of the constitution; and very early addiction to the vice of masturbation. This last cause is frequently productive of those states of imbecility, or slighter forms of mental deficiency, observed at advanced stages of childhood, or near the approach of puberty. To these causes may be added the use of improper coverings on the heads of infants and children, as ably illustrated by M. Foville (*Deformat. du Crane result. de la Méth. de couvrier la Tête des Enfans.* Paris, 1834.).

532. *B. The pathological causes* are chiefly imperfect, deficient, or interrupted developement of the encephalon, and affecting it either partially or generally; sometimes associated with changes of the consistence and form of the brain, and not infrequently with some of the usual consequences of old or previous inflammation of the membranes — particularly the arachnoid, and of the cerebral structure. Morgagni and others found the brain harder than natural. Meckel says that

---

* A physician was consulted by a gentleman who was anxious to marry, to secure a fortune in his family, but had been some time deterred from marriage by a consciousness of weakened sexual powers, consequent upon masturbation in early life. As he was young, and his constitution had apparently not suffered seriously, he was advised to marry, under the conviction that a moderate exercise of the sexual functions would assist in restoring their energies. The advice was adopted; but the first child that was born was an idiot. The later children were sound: he had gradually recovered his powers.

it is often drier, lighter, and more friable than usual. MALACARNE states, that the convolutions of the brain are numerous in proportion to the intelligence, and that in idiots they are always few. They are very generally smaller, less prominent, and less numerous in these persons, than in others. M. ESQUIROL has observed the lateral ventricles uniformly very small in idiots. In some, one hemisphere is much less developed than the other; and, occasionally, one lobe is more deficient than the rest. In these cases, one or more limbs have been paralysed. — These deficiencies have been more frequently observed in the anterior, than in the other lobes. The cerebral substance is sometimes softened in one part, and hardened in another. For further details, see the articles BRAIN, CRANIUM, and EPILEPSY.

533. v. The TREATMENT of imbecility and idiotcy is rather *preventive* than *curative*. — *Prevention* depends entirely upon the avoidance of the remote causes, and upon the employment of those means which tend to strengthen the physical powers of the parents, and of the offspring after birth. That much is owing to the constitutional powers of the parents, is shown by numerous facts, and by the circumstance of several idiots or imbecile persons being often met with in one family. Attention to the general health of the infant, good nursing, daily cold ablutions, frictions of the surface, a dry and temperate atmosphere, frequent changes of air, and due promotion of the several secretions and excretions, are the chief means by which a healthy developement of the offspring of debilitated persons can be secured. In every case, a strong, healthy, and young wet-nurse should be procured immediately for the infants of such parents. As dentition and childhood approach and advance, the means and the cares advised in the articles AGE and DENTITION are especially required. — The *curative means* are limited to physical and moral education, which may be of use in the slightest forms of imbecility, but which are of no avail in the more manifest states, and in idiotcy.

X. INSANITY, PUERPERAL. — SYN. *Insania Puerperarum, Mania Puerperalis; Puerperal Mania.*

534. DEFIN. — *Disorder or aberration of mind, of either a partial or general form, occurring in any period of the puerperal states.*

535. i. DESCRIPTION. — *Puerperal insanity* may appear in a slight or partial, or in a severe and general, form. It most frequently, however, assumes the form of mania, and melancholia. In a few cases it presents a mixed character, or that of melancholia alternating with mania. Insanity may occur — 1st, At any time from conception to parturition — the insanity of pregnancy — *Insania gravidarum;* — 2dly, From parturition to about three weeks or a month subsequently — the insanity of parturition — *Insania post partum;* — 3dly, At any period during lactation, or soon after weaning — the insanity of lactation — *Insania lactantium.* In the *first* of these periods, it is usually slight or partial, chiefly affecting either the moral manifestations or the understanding. In the *second*, it most frequently assumes the form of acute mania,—sometimes passing into a chronic state,—but rarely assuming the character of dementia or fatuity. In the *third*, melancholia, slighter forms of mania, and partial insanity are the most common. — Any of these states of disorder, occurring in any of the *periods* now specified, may be *simple*, or *complicated*, in respect of succession, or co-existence, with some other malady — particularly *hysteric affections, epilepsy, convulsions, catalepsy* and *cataleptic ecstacy, uterine hæmorrhage, disease of the uterus or ovaria.*

536. *A. Insanity during Pregnancy — Insania Gravidarum.* — Pregnancy generally occasions more or less excitement of the nervous and vascular systems; and sometimes gives rise to various morbid impulses or aberrations of mind — especially in females hereditarily predisposed to insanity. The mental disorder may appear immediately upon conception, and disappear on quickening; or it may occur at any period of utero-gestation, continue through, and cease upon, delivery; or it may persist through all the circumstances consequent upon parturition. In this latter case, however, it seldom retains the same form or character, but passes into one more general or severe; melancholia, or any other partial disorder, being aggravated into mania. In some cases, the mental affection commences as hysteria, or in some one or other of its numerous states; and in two cases in which I was consulted, it was preceded by catalepsy and cataleptic ecstacy — affections intimately allied to hysteria.

537. The most frequent states of mental disorder observed in this period are *melancholia*, and the *moral disorders* described above (§ 69. *et seq.*). The singular feelings and desires — the whims and caprices — frequently attending this state, cannot be considered as amounting to insanity, inasmuch as they seldom engross the mind, or withdraw it from all other thoughts and pursuits, or overwhelm the natural feelings, or influence the conduct. As soon, however, as any singular desire exercises such a sway as this, — when it engages the mind and influences the conduct, uncontrolled by natural sentiments and requisite occupations, — it then amounts to moral insanity, and requires both moral and physical treatment. In some females, pregnancy occasions not only irrepressible fears and melancholia, but also various disordered impulses, productive of crime or various unlawful acts, either before the control of reason can be exercised, or in opposition to the feeble efforts of the understanding (§ 92.). In unmarried females, the melancholic feelings, the irrepressible fears, and the morbid impulses of the mind, are often heightened by shame, remorse, the abandonment of the seducer, the consciousness of poverty, or the fears of ill-treatment. Under such affliction, the mind may be so disordered as to perpetrate various crimes, or even suicide. In this state, consciousness may be lost for a time, and acts be committed, before it be restored, of the most flagrant nature, and the most repulsive to the natural disposition and feelings. This is the more likely to occur, if the mental distress be attended by fits of *leipothymia*, or of *fainting*, or by *convulsions.* In some cases, recovery from these attacks, or the restoration of consciousness, is attended by a short period of maniacal excitement, or a state of momentary delirium, during which suicide, murder, or incendiarism, has been perpetrated. In most cases of mental disorder occurring during pregnancy, and

in all that I have seen, there was either an hereditary predisposition to it, or the patient had been previously subject to obstinate hysterical affections, and had experienced overwhelming or intense emotions of the mind.

538. *B. Insanity after Delivery — Insania post Partum — Paraphrosyne Puerperarum*, SAUVAGES. — *a*. Insanity consequent upon parturition is often preceded, during pregnancy, by harassing fears, and unfavourable presentiments. In some cases, various hysterical affections, preternatural susceptibility, great exuberance or depression of spirits, suspicions, irritability, a state of stupor or sopor, and slight or short attacks of mental aberration, have occurred during gestation. Generally the disease appears from the second or third day to the sixteenth or seventeenth; but it may occur almost immediately after parturition, or be delayed to the third or fourth week. Some writers assign the third and fourth, and the thirteenth, fourteenth, and fifteenth days, as the most frequent periods of its appearance. The chance of an attack, however, progressively diminishes after the third or fourth day. The disorder may commence with want of sleep, inquietude, sadness, anxiety, or ill-grounded fears respecting some matter; the phenomena of mania, or profound melancholia, supervening upon these symptoms. Sometimes an explosion of mania takes place more or less suddenly; but more frequently the patient's manner becomes quick, the temper irritable, and the nights restless, for two or three days before the attack. The form of the mental disorder varies remarkably; but the maniacal states are the most common. Next to these are melancholia, and diversified forms of monomania. During either of these disorders, and in melancholia especially, suicide may be attempted or committed. Mania may alternate with melancholia, and this last with other varieties of partial insanity. At first, and particularly in cases occurring soon after delivery, the disorder is maniacal. Sometimes the patient evinces a childish disposition for harmless mischief; is gay and joyous; laughs, sings, and talks loud and long, occasionally obscenely, and is careless of the infant and of every thing about her. She is often also suspicious; imagines every thing poisoned; and is busy with some idea, illusion, or some fancied object. In other cases, the maniacal excitement is much more intense; and the conversation and conduct more violent. These states may pass into melancholia, but very rarely into dementia or fatuity.

539. *b. The physical symptoms* are referrible chiefly to the digestive organs, and to the nervous system. The *bowels* are torpid, the secretions and excretions impaired and morbid; the stools are unhealthy, and generally very dark and offensive; and, from inattention or obstinacy, sometimes passed without regard to the natural calls. The *tongue* is moist, white, furred, or loaded; and as the disease proceeds, it sometimes becomes brownish, — mucous sordes accumulating on the teeth and lips. There is little or no appetite, and rarely much thirst. The *pulse* is frequent, small, weak, compressible; and sometimes it is but little, or not at all, accelerated, or it becomes less frequent as the disease proceeds. The *skin* is relaxed and moist, particularly about the neck, and generally cool, especially on the extremities. The head is often hot, or is warmer than usual, but the heat is not always permanent; it frequently occurs at intervals, and is sometimes greatest when the rest of the body is cool. Occasionally the scalp is cool throughout. *The general heat* of the body is rarely increased, unless when the disease is coincident with the first secretion of milk, or with inflammation of the breasts, or unless when caused by the violent exertions of the patient. Pain, sense of pressure, or tightness, of the *head*, is often felt, with uneasiness of the scalp, noises in the ears, and sometimes throbbings of the temporal arteries. There is little or no *sleep*. The *face* is generally pale, unless when the maniacal excitement is great, and then it is often flushed or turgid. The eyes are vivid or slightly red; but both they and the face are occasionally pale, although the patient is most violent. The *abdomen* is usually soft, cool, and free from pain on pressure, unless sometimes in the hypogastric and iliac regions. The *breasts* are generally flaccid, and the secretion of milk either impaired or arrested; but the milk, in some instances, is not materially diminished, although it is generally deficient in its healthy and nutritive properties. The *lochia* are often deficient, but they are sometimes abundant or offensive.

540. *c*. The insanity of females recently delivered, commonly assumes the form now described; but its character varies remarkably: in some cases, it nearly resembles *sub-acute phrenitis*, delirium supervening, as in the form of the disorder described by Dr. J. BURNS, in which the symptoms of morbid vascular action in the encephalon precede the mental disorder. In other instances, the insanity verges in its character towards *low nervous fever*: it is then generally preceded by watchfulness, fever, the supine posture, heat of scalp, and injection of the conjunctiva. Images or illusions supervene, the ideas become rapid, and the delirium, passing into a muttering delirium, is soon confirmed. The pulse is quick, and the milk and lochia are usually suspended. Enough has been stated to show that, as regards puerperal insanity, as well as many other maladies, the marked lines of demarcation attempted to be drawn by authors and nosologists do not exist in nature; but that there is a gradual approximation of character observed in this, to other diseases of the nervous system, — that the transition from puerperal insanity to phrenitis on the one hand, and nervous fever on the other, is often manifest; cases occurring in practice of an intermediate nature, and referrible to one malady as much as to another.

541. *C. Insanity during or after Lactation — Insania Lactantium — Mania Lactea*, SAUVAGES — is generally gradual in its approach; or it is preceded by symptoms premonitory of its occurrence. When, however, violent impressions are made upon the mind, or the secretion of the milk is suddenly disturbed, the disorder may burst forth unexpectedly. Generally, however, a change of temper or disposition is remarked for some time previously. The manner becomes hurried, sleep disturbed, the temper irritable, the countenance suspicious or distrustful, and the patient voluble and negligent of her infant. At length, sleeplessness, incoherence, or violence of language and conduct, and delusions, supervene. Occasionally, various hysterical and cataleptic symptoms are associated with these; and sometimes acts of violence, or attempts at suicide, are perpetrated, even

before the nature of the malady is suspected by her friends. The disease may occur at any period of lactation; but it is more frequent on weaning, or very soon afterwards, than at any other time. The melancholic and monomaniacal forms of insanity are oftener observed during this period, than violent mania: and when the latter occurs, it is apt to pass into melancholia, or to alternate with it. Insanity during this and the preceding periods may present some one or other of the *complications* noticed above (§ 166. *et seq.*).

542. ii. DIAGNOSIS.—The diagnosis of puerperal insanity is sometimes difficult, especially after delivery. Some modern writers have endeavoured to point out differences, rather than to describe the relations, really subsisting between it and other diseases, especially *phrenitis* and low *nervous fever*. But, as I have already stated, the transition of the one into the other, is not infrequent; or, the pathological condition of these maladies are very nearly the same in many cases. The absence of fever has been considered as particularly characteristic of puerperal insanity; but fever accompanies a considerable proportion of cases, especially those commencing about the fourth or fifth day, when the secretion of milk excites, some degree of febrile commotion in the system; and, at a later period, when the lochia disappear. Still it is a rapidity of pulse, and an irregular determination of blood, with increase of heat about the head, rather than fever, that are more commonly observed.

543. *a.* In *phrenitis*, the patient has headach, vertigo, throbbing in the temples, a beating noise in the ears, flushing of the face, injection of the conjunctiva, intolerance of light and of noise, heat of the scalp, rapid pulse, dry skin, suppression or sudden diminution of the milk and of the lochia, constipated bowels, and scanty and high-coloured urine, before delirium appears; and very frequently these symptoms are ushered in with chills or rigors. In proportion as these phenomena are manifested before the mental disorder appears, the disease may be viewed as possessing an inflammatory character. Puerperal phrenitis, moreover, soon passes into stupor, coma, subsultus of the tendons, catchings in the limbs, and unconscious evacuations; and often terminates unfavourably as early as the third, fourth, or fifth day, and rarely passes the eighth; whereas, puerperal mania, even in the most febrile and unfavourable cases, generally is prolonged beyond this period, unless very injudiciously treated. In the former, the physical disease is manifest and developed before the delirium appears, and is evidently the cause of it; in the latter, the mental disorder is coetaneous with, or even previous to, the physical disturbance.

544. *b.* When *low nervous fever* occurs after delivery, or during lactation, it will hardly be confounded with this disorder, as the febrile commotion precedes mental disturbance for several days; muscular power is prostrated, the patient preserving the supine posture, or being incapable of continuing any other; the pupils are but little sensible to light; the tongue is tremulous; the patient is sleepless, and complains of confusion and giddiness, rather than of pain of head; and when delirium supervenes, it is of an incoherent and muttering kind, and very rarely violent, or attended by muscular exertion. The pulse is very quick, and small; the bowels are readily moved; and the lochia or milk is suppressed. As the malady proceeds, coma, startings of the tendons, pickings of the bedclothes, unconscious evacuations, and the usual phenomena of nervous exhaustion terminate life.

545. These maladies the discriminating physician will never confound with true puerperal mania; and he will carefully distinguish such cases as present an intermediate form between either of them, and the latter disorder. He will, moreover, keep in recollection the circumstance of these diseases frequently leaving, as the physical disorder subsides, more or less of mental disturbance behind them, which may assume the form of chronic mania, or melancholia; and the risk of this result will be great in proportion to the evidence of an hereditary predisposition to insanity, and to the nervous or melancholic temperament of the patient.

546. *c. The relation of puerperal insanity to delirium tremens* has not been adverted to by writers, although the connection is obvious in many instances, and of practical importance. I have been called to several cases, which, in their remote causes, and essential features, were instances rather of delirium tremens occurring in the puerperal state, than true puerperal insanity. In some cases, the tremor is hardly to be observed, or is present only for a short time; and yet, the affection presents the other characters of that disorder, and has arisen chiefly from the abuse of intoxicating liquors. Puerperal insanity, attended by tremor, usually appears soon after delivery, and is to be imputed chiefly to the effect produced on the system, already injured by excesses, by the shock of parturition, by the consequent evacuations, and by the abstraction of accustomed stimuli.

547. iii. PROGNOSIS.—Opinions of the result of puerperal insanity were either stated in too favourable terms, or imperfectly ascertained, previously to the appearance of the works of ESQUIROL, HASLAM, BURROWS, and GOOCH. M. ESQUIROL states that, of 92 cases, 53 recovered, and 6 died, — leaving 31, or 1 in 3, as incurable. Of 85 cases, admitted at Bethlem, Dr. HASLAM observed 50 recover, and 35 incurable. Dr. BURROWS mentions 57 cases, of which 37 recovered, — 28 within the first six months; 10 died, 1 committed suicide, and 11 remained uncured. Dr. GOOCH observes, that these statements present a prospect unnecessarily gloomy and discouraging; for, of the many patients, about whom he had been consulted, he knows only two, who are now, after many years, disordered in mind, — and of them, one had already been so before her marriage. It should, however, be recollected, that only the more obstinate and severe cases are sent to asylums, and not until medical treatment had been already employed; hence the more unfavourable results furnished by ESQUIROL, HASLAM, and BURROWS. Of those not sent to such institutions, a much greater proportion, than that assigned by these writers, recover, under judicious management, particularly of the non-febrile form of the malady, which is fortunately the most common. Cases attended by much febrile action, more especially those approaching either to the character of phrenitis on the one hand, or to that of nervous fever on the other, are attended by more danger; and frequently either terminate fatally, or in per-

manent insanity, — particularly if an hereditary predisposition to insanity exists. Of the 10 cases which ended in death, out of 57, recorded by Dr. Burrows, 7 occurred within twelve days, 2 within seven weeks, and 1 after four months. Two had active uterine disease, and 2 others died in consequence of relapses.

548. The *causes* have a considerable influence on the result. Of the cases which I have seen in the Queen's Lying-in Hospital, and to which I have been called in private practice, a much larger proportion of incurable and fatal cases has existed amongst the unmarried, than in the married. Previous distress of mind is sufficient to account for these results. Of the cases of married females, that have occurred in the above Institution, since I became consulting physician to it (1822), two were represented to me by the matrons as having been caused by remorse, consequent upon incestuous intercourse; and both these terminated fatally. It may be inferred, from the results observed by several practitioners, that about four patients in five recover their intellects, and that about one in eight die, generally within the first month of the disease, the greater number within a fortnight. The proportion, however, of unfavourable cases, is manifestly greater than this, in unmarried females. The chief danger in this disease, especially in the more pure, or non-febrile, form of it, arises from debility and exhaustion of nervous power. And this is the more to be dreaded, when the disorder follows hæmorrhage, or improper bleeding, when the pulse is very rapid, weak, or small, or fluttering; and when there are great restlessness, and long-continued want of sleep. Recovery is generally more likely to take place, the more remote the attack from the period of parturition, or when the disorder occurs during lactation. The appearance of the disease during pregnancy should lead the physician to anticipate a severe form of it after delivery. Moral causes, also, give rise to more severe and dangerous attacks, than physical causes; and the maniacal form terminates favourably more frequently, and in a shorter time, than the melancholic, in as far as the recovery of reason is concerned; but deaths are more likely to occur in it, — at least, after a short period from the attack. Of 55 recoveries, M. Esquirol states, that 38 took place within the first six months. Of 35 recoveries, recorded by Dr. Burrows, 28 occurred within the same period. When the delirium is of a gay character, and the patient sings, laughs, talks wildly, and is a little mischievous, it rarely lasts long; but when it is attended by great suspicion, apprehension of poison, and sullenness, or when suicide is meditated or attempted, it then assumes a more serious character, and is not soon cured. Upon the whole, this disorder requires a very cautious and guarded prognosis.

549. iv. Causes. — *A.* The *predisposing causes* of puerperal insanity are nearly the same as favour the occurrence of other forms of mental disorder,— the puerperal states being superadded causes of predisposition to these, and the period immediately following delivery being the most influential of these states. Hereditary influence, constitutional debility, and susceptibility of the nervous system, most powerfully co-operate with the puerperal states. Of the 92 cases noticed by Esquirol, 16 were attacked from the first to the fourth day; 21, from the fourth to the fifteenth day; 17, from the sixteenth to the sixtieth day; 19, from the sixtieth to the twelfth month of lactation; and 19, after forced or voluntary weaning. Dr. Burrows remarks, that of the 57 cases which he has observed, the disease commenced on or before the fourteenth day in 33; and after the fourteenth day, and before the twenty-eighth, in 11 instances. — As to the *age* at which the disorder most frequently occurs, he observes, that from the age of twenty to thirty it is more frequent than at any other age, in the proportion of nearly two to one. M. Esquirol states, that of 92 females, 22 were from twenty to twenty-five years of age; 41, from twenty-five to thirty; 16, from thirty to thirty-five; 11, from thirty-five to forty; and 2, from forty to forty-three. — The *comparative frequency* of this disease in married and unmarried females has not been duly attended to. Nearly one third of the cases adduced by M. Esquirol were those of unmarried women; whilst a fourteenth only of those observed by Dr. Burrows were unmarried. There can be no doubt, that the disease is, relatively to the number of pregnant single women, much more common in them than in the married. This is to be imputed to the more general and intense operation of the moral exciting causes on the former than on the latter. M. Esquirol imputes the frequency of this malady, in the unmarried, in great measure, to the influence of suppression of the lacteal secretion, and premature weaning, — comparatively few unmarried females suckling their children. In this country, however, the majority of them find situations as wet-nurses. Females who have been subject to *hysteria*, particularly its more severe and obstinate forms, previously to pregnancy, are very liable to puerperal mania; and those who have been once attacked, are highly predisposed to the disease on each successive return of the puerperal states. Of the predisposition arising out of hysteria, I have met with several remarkable instances. Some writers have remarked, that nearly one half of the cases, which they have treated, have, more or less, depended upon hereditary predisposition. Of the instances, which I have seen in the lower classes, a large proportion has occurred in those who had been addicted to the inordinate use of spirituous or malt liquors.

550. *B.* The *exciting causes* are also very frequently the same as produce mental disorders in other circumstances; although there are others, which especially belong to the puerperal states, or which produce their effect chiefly in these states. There are some, also, of a physical or pathological kind, consisting of changes in the sexual organs and nervous system, connected with impregnation, parturition, and lactation. The most common exciting causes are, moral emotions, and errors of diet and regimen. Of the latter, improper food, stimulating or heating articles, exposure to cold air or currents of air, damp clothes, the evaporation of liquid perfumes, the suppression of the lochia or of the milk, premature exertion, the use of cold fluids, and neglect of the abdominal secretions and excretions.

551. *Moral emotions* have a remarkable effect upon both the nervous system and the secretions, during the puerperal states — great in proportion to the nearness of their occurrence to the period of delivery. The comparative influence of the

moral causes has been attempted to be estimated by M. ESQUIROL and Dr. BURROWS; but the application of numbers to the estimation of the separate value of individual influences, in the production of disease, especially as diversified combinations of both exciting and predisposing causes generally occasion it, leads rather to erroneous than to correct conclusions; and is, at best, a parade of accuracy, in respect of matters which admit only of approximations to the truth. Besides, the relative influence of particular causes vary with the age, constitution, modes of living, previous health, and occupations of the patient; and with seasons, weather, epidemic states of the air; and with climate, situation, and peculiar circumstances of the country. M. ESQUIROL states, that 46 of 92 cases of puerperal insanity were caused by moral emotions, whilst Dr. BURROWS estimates the physical as being ten times more influential than the moral causes. My observations lead me to infer, that M. ESQUIROL is very much nearer the truth, even allowing hereditary predisposition, which exists in a very large proportion of cases, to be a physical cause.— The most frequent moral emotions are those which have been already noticed (§ 549.) as operating chiefly on the minds of the unmarried; also fright, fear, anxiety, chagrin, anger, domestic dissentions, grief at the desertion of the father, or at the death of the infant; dread of the malady after having experienced an attack, &c. The influence of terror and fear was shown by the cases which came under the care of M. ESQUIROL, in 1814, and 1815. Of 13, which he admitted in the former year, 11 were caused by fear. A sudden shock, or whatever startles or alarms the patient, as a sudden clap of thunder, will often occasion the disease, especially soon after parturition. The abuse of intoxicating liquors exerts both an exciting and a predisposing influence; and it has not only a direct, but also an indirect, effect. These liquors either excite the malady by immediately stimulating the nervous and vascular systems, at periods when susceptibility is augmented and vital power impaired; or, in other cases, they indirectly cause it, by the sudden abstraction of the accustomed excitement they have afforded, at a time when the frame is depressed by the suffering and by the evacuations attending parturition. When puerperal insanity proceeds from this source, it may either assume more or less of the characters of delirium tremens (§ 546.), or vary but little from its usual forms. In order that the treatment should be successful, care ought to be taken to ascertain the existence or non-existence of this cause from the attendants most competent to furnish the information.

552. v. PATHOLOGICAL STATES. — *A. The appearances observed after death*, caused by pure or true puerperal insanity, particularly when it occurs soon after delivery, or during suckling, consist chiefly of deficiency of blood in the brain and its membranes; and, in some instances, of slight effusions of serum between the membranes, and in the ventricles. There are no signs of inflammation, or even of congestion, excepting in such cases as have approached in their characters to phrenitis on the one hand, or to nervous fever on the other; and in these, appearances of an inflammatory or of a congestive nature, with or without effusions of serum, are often observed. The pure cases of the malady present little beside anæmia of the brain and its membranes, and of the system generally. Morbid changes in other parts of the body, or even in the sexual organs, are coincidences or accidents only.

553. *B. The morbid condition more immediately occasioning the malady* seems to consist of increased nervous susceptibility and greatly impaired power, frequently associated with deficiency of blood. The balance of the circulation is also often disturbed, and irregular determinations of it take place, especially to the brain, and to the uterus. Whilst the circulation is more active in one quarter, it is deficient in others, and the functions of the brain are thus directly or sympathetically disordered. — After impregnation, the organic nervous influence of the uterus and ovaria is more or less developed and exalted, and the excitement of these organs often extends to, or reacts upon, the cerebro-spinal nervous system, and its manifestations, exciting and disordering it and its functions. After delivery, the susceptibility of the brain, and of the nervous system generally, is increased, and the disposition of these to be sympathetically affected by the states of the mammæ, uterus, and ovaria proportionately augmented, — the susceptibility being great in proportion to the shock which the system has sustained from the parturient process, and to the loss of blood and exhaustion. The occurrence of the disease during lactation is to be imputed chiefly to exhaustion, debility, and vascular inanition; and its appearance after weaning, to a disturbance of the balance of the circulation,— a greater determination of blood taking place to the brain than to other parts, upon the cessation of the secretion of milk, as well as upon the premature cessation of the lochia.

554. vi. TREATMENT. — *A.* Insanity occurring *during pregnancy* is generally either partial, or of short duration when it assumes a maniacal form. In either case, the treatment should chiefly depend upon the state of the vascular system as to fulness, action, and tone. When the circulation is deficient in none of these conditions, and particularly when plethora exists, a small bloodletting will then be useful; but in doubtful, or other circumstances, cold applied to the head, warm and stimulating pediluvia, refrigerants, and refrigerating diaphoretics, cooling aperients, and antispasmodics, conjoined with narcotics, as hereafter prescribed, must constitute our principal means of cure; aided, however, by judicious moral management, and by appropriate diet and regimen.

555. *B. Insanity occurring soon after parturition* requires the utmost discrimination in ascertaining—1st, the presence of the disease in its pure or unmixed character; — 2dly, those mixed states which partake either of the character of phrenitis, or of that of low nervous fever: and the greatest care in the selection of remedial agents. In this disease it is always most important to consider the state of the vascular system, in connection with nervous excitement; and to inquire as to the dependence of whatever degree of vascular action that may be present upon the condition of the nervous system, and upon the mental disorder and muscular efforts. In all cases, moreover, it should never be overlooked, that the frame has received a shock, during the parturient process, — that the nervous system has endured great excitement and suffering, — and that the vascular sys-

tem has sustained a loss sufficient in many cases seriously to disturb the healthy relation subsisting between the state of the vessels and their contents, and to disorder the balance of the circulation in different parts of the body. These considerations will generally guide the practitioner in the treatment of the more difficult, doubtful, or mixed cases: the more simple and pure instances of the disease will present neither difficulty nor doubt.

556. *a. Bloodletting*, in any mode, is most injurious in puerperal mania and melancholia, and in such cases as are attended by fever; or, where the symptoms approach those of delirium tremens. Indeed, puerperal insanity occurring in the lower classes of society, not infrequently, is very closely allied to that disorder, owing to the circumstances already noticed (§ 546. 551.). In those cases which assume the form of *nervous fever*, vascular depletion is also pernicious. Where, however, the malady approaches, in some of its features, a *phrenitic form*, — when the head is hot, the face flushed, the pulse hard or strong, and the secretions suppressed, the propriety of bloodletting might seem to be obvious; yet, even in these cases, the practice, although cautiously resorted to, might be injurious, or fail of proving beneficial. Those symptoms are sometimes fallacious; for they are occasionally produced by the violence of the nervous and mental excitement, or of the physical exertion, relatively to the power of the system, and are of short duration, — dangerous exhaustion soon supervening. In such instances, even a small bloodletting would only hasten and increase the consequent depression. In cases, which commence with headach, fever, flushing of the face and eyes, diminished secretion and excretion, and occasionally preceded by chills or rigors, and in which the mental disorder is clearly consequent upon the inflammatory and febrile symptoms, a recourse to bloodletting, and to other antiphlogistic means, is obviously requisite, for the disease is more or less inflammatory, or consists of a state of active congestion, approaching inflammation. Yet, even in these cases, the practitioner will be guided, in some measure, by the rapidity with which the mental disorder followed the physical disturbance, by the previous condition as well as the existing circumstances of the patient, by the evacuations attending and consequent upon parturition, and by the several phenomena characterising the case. Whenever the mental affection follows quickly upon the cerebral and constitutional symptoms, vascular depletions of any kind are seldom of service, unless very prudently prescribed.

557. When there are much heat of the scalp, flushing of the face, beating of the carotid arteries, and no indication of urgent debility or exhaustion, the previous condition and evacuations of the patient furnishing no sufficient reason for the existence of these states, then may leeches be applied behind the ears or around the occiput, and cold to the head, with great advantage. Whilst ice, cold lotions, &c. are placed around the shaved head, the feet and legs should be frequently bathed in warm water, to which mustard, or scraped horse-radish, has been added. In the majority of cases, where inflammation is dreaded after delivery, there is only active determination of blood to the head, the circulation in the extremities and in other parts being impaired; and in these the continued application of cold to the head, and the frequent or persevering use of derivatives to remote parts, or to such as experience an insufficient supply of blood, will generally remove the disorder. The application of blisters to the nape of the neck has been advised by many, but they are seldom of much service in the maniacal states of disorder. In the melancholic form, or when there is a tendency to stupor, rather than to high excitement, blisters on the nape, or behind the ears, are generally of use.

558. *b.* In a great proportion of cases of puerperal insanity, fæcal accumulations have formed in the alimentary canal, and morbid secretions have collected in the gall-bladder, hepatic ducts, in the cæcum, and in the cells of the colon. The existence of these collections is indicated by a loaded, foul, or furred tongue, by a fœtid breath, by a lurid or discoloured state of the skin and of the complexion, by more or less fulness in the regions of the cæcum and sigmoid flexure, and by dark and offensive evacuations. The propriety of *purgatives* in all such cases, and of *emetics* in many of them, is undoubted. The latter, however, should not be used when debility or exhaustion is extreme, — when the face is pale, the skin cold, and the pulse very quick and weak. Ipecacuanha is the best emetic in ordinary circumstances; but when vital depression is considerable, any of the warmer emetics prescribed in the *Appendix* (F. 402, 403.) may be used. After its operation, calomel may be given with camphor and some cathartic extract, and a few hours subsequently a draught, with rhubarb and magnesia, or any other purgative, may be taken. The full operation of these upon the bowels should be secured either by their repetition, or by the administration of enemata, and especially of those containing castor oil and spirits of turpentine. In most cases, the stomachic aperient, consisting chiefly of the compound infusions of gentian and senna (F. 266.), or the compound aloetic pill or decoction, will be the most appropriate medicines.

559. *c.* Having evacuated morbid secretions and fæcal collections, it is next requisite to support the constitutional powers and allay nervous excitement by *antispasmodics* or *diffusive stimulants*, conjoined with *narcotics* or *sedatives*. Where debility, exhaustion, or vascular inanition, is urgent, it will generally be necessary either to combine restoratives or stimulants with alvine evacuants, where the latter are requisite, or to give the former in the intervals between their exhibition. — *Narcotics* are more beneficial in puerperal, than in any other form of insanity, particularly when conjoined with camphor, ammonia, or aromatics. Since 1815, I have usually prescribed five grains of the extract of *hyoscyamus* with an equal quantity of *camphor*, in the morning and afternoon, and double this quantity of each at bed-time. Where there are much heat of the head, flushing of the face, and thirst, these symptoms should be removed by cold applications, purgatives, refrigerants, and external derivatives, before camphor or ammonia is exhibited; but notwithstanding their presence, in a moderate degree, the camphor and hyoscyamus may be exhibited, provided that these means are persisted in, and the enemata already advised are occasionally administered. In still more urgent cases, the camphor may be given

more frequently, conjoined either with hyoscyamus or with *opium* or *morphia*, — a larger dose being given shortly before bed-time. I have rarely found the following draught to fail in giving repose, and in contributing to the clearing up of the mind subsequently, when prescribed after the requisite alvine evacuations, and when the head is kept cool, and the lower extremities warm: the enema has also proved very generally of service.

No. 277. ℞ Morphiæ Acetatis gr. ⅓; Liquoris Ammoniæ Acetatis ʒ jss.; Mist. Camphoræ ℥j.; Acidi Acetici ♏ vj.; Spiritûs Lavand. Comp., Spir. Myristicæ, Spir. Rosmarini, āā ʒss.; Syrupi Papaveris ʒj. M. Fiat Haustus, horâ somni sumendus.

No. 278. ℞ Camphoræ rasæ gr. x.; Assafœtidæ ʒss—ʒj.: Extr. Rutæ ʒss.; tere cum Olei Terebinthinæ ℥j.; Olei Ricini ℥j. (vel Olei Olivæ ℥iij.); Decocti Avenæ ℥x. ad ℥xiv.; Syrupi Papaveris ʒij. ad ℥ss. Fiat Enema, pro re natâ injiciendum.

560. *d*. It is important *to administer due support to the system during the treatment of the disease*, more especially when there is neither a febrile state of the pulse, nor heat of the head or surface; and this support, whether *medicinal* or *dietetical*, should have due reference to the previous modes of living and habits of the patient. When puerperal insanity becomes chronic, or when it appears in the course of suckling, and particularly when there is a total absence of inflammatory or febrile symptoms, *tonics* — especially the infusion or decoction of *cinchona*, or any of the *bitter infusions*— may then be given with *ammonia* and *aromatics*; the secretions and excretions being promoted by the usual means; change of air and of scene, and appropriate moral treatment, being brought in aid of the physical remedies. When the patient has been addicted to the use of intoxicating liquors, and especially if the disease assume a form approaching to delirium tremens, then *opium* with *camphor* or with *ammonia* should be freely administered. *Brandy* or *wine* may be given in arrow-root; or even *warm*, *spiced*, or *mulled*, *wine*, or *ale*, may be occasionally allowed.

561. *e*. The *diet* requires much attention. Drs. Prichard and Gooch remark that patients incur some risk of being starved in this disease, through the mistaken notions of their attendants, who are apt to consider the excitement of the malady a reason for withholding food; when this very state, owing to the exhaustion often produced by it, renders due support especially necessary. Farinaceous fluids of a nutritive quality, as rice, arrowroot, sago, &c., should be given at short intervals, when febrile symptoms preclude the use of animal food. Warm milk, or broth, may also be allowed, but should be taken in small quantity at one time. In protracted cases, solid meat, malt liquor, wine and water, bottled porter, or the bitter ale usually sent to India, will often be of service. Patients who have been accustomed to live fully, and to the use of stimulating liquors, must be allowed such food and beverages as their physical symptoms will permit, without reference to the state of the mental disorder. When suckling is concerned in producing, heightening, or perpetuating the mental affection, by draining an already weakened constitution, a nurse must be procured, and a nutritious and tonic diet and regimen prescribed, with change of air, and the use of chalybeate waters.

562. *C*. When *insanity appears during suckling*, the treatment is nearly the same as that just described. A nutritious and cordial *diet* should be immediately allowed; and meat taken daily, with about four ounces of wine. Purging in such cases is injurious, but the bowels should be kept in a regular state by the compound decoction of aloes, or by the infusions of gentian and senna. If the mental disease occur after sudden weaning, and particularly if it assume a maniacal form, and if there be any reason to infer that an inflammatory affection of the brain has supervened upon the sudden suppression of the milk — if the symptoms already mentioned, as indicating this state, appear, then appropriate means should be prescribed; but this is not to be determined, nor is the treatment to be regulated, by the disorder of the mind, but by the bodily symptoms.

563. When the *milk* becomes scanty, or ceases to be secreted, and the mental disorder seems to be aggravated by this circumstance, or has supervened upon it, the secretion should be encouraged by keeping the child to the breast.—If the *lochia* disappear prematurely, means should be taken to procure its return. For this purpose, the warm bath, the semicupium, or the hip bath, may be used; and, if these fail, leeches may be applied on the insides of the thighs, near to the groins, and the hip bath be subsequently employed. Warm fomentations may also be applied to the pudenda, or over the pubes. At the same time, cold applications around the shaved scalp ought to be assiduously employed.

564. The *constant attendants* on the patient should control her mildly but effectually, not irritate her, but protect her from self-injury. Servants or monthly nurses can seldom do this; they ought, therefore, to be removed, and a nurse accustomed to the care of deranged females placed in their stead. The patient should never be left alone; and every thing with which self-injury can be effected should be carefully removed. The windows ought also to be secured. The husband or near relations ought never to be left alone with the patient, but should be excluded until the state of the disorder permits their admission. It is generally necessary to remove all persons who are sources of excitement of any kind. Seclusion in some mode or other — partial or complete — is generally necessary, — at least, for some time. There is often, however, great difficulty in carrying this into effect, in such a way as will tend to the comfort and speedy recovery of the patient. Removal to an asylum is not so frequently requisite for the mental disorders of puerperal patients, as for insanity occurring in other circumstances. It is principally required in the more obstinate and prolonged cases; and after other measures of partial or complete seclusion have been tried. Dr. Gooch remarks, that, where seclusion has been adopted, there may come a time, at which some interruption to this solitary life may be advisable. When the disease has lasted long, when the patient expresses a strong wish to see some near friend, when she entertains illusions which the sight of some one may efface, the admission of such person should be tried. It is well observed by Dr. Haslam (*Moral Management of the Insane*, p. 14.), that confinement is too indiscriminately recommended and persisted in. An intercourse with the world has dispelled, in many instances, those hallucinations, which a protracted seclusion, in all pro-

bability, would have added to and confirmed. In its passive state, insanity has been often known to wear off, by permitting the patient to enjoy her liberty, and to return to her usual occupations and habits. There is obviously a period of the malady approaching convalescence, in which the bodily disease is loosening its hold over the mental faculties, and in which the latter are capable of being drawn out of the former by judicious appeals to the mind, and by a salutary moral management.

XI. Suicidal Insanity. Syn. — Suicide — Self-homicide; *Suicidium, Autochiria; Melancholia Suicidium; Selbstmord*, Germ.; *Le Suicide*, Fr.; *Suicidio, Suicida*, Ital.

565. Under *suicidal insanity I proceed to consider self-destruction or self-homicide, whether it be seriously entertained, or attempted, or perpetrated.*

566. The religion, the laws, and the manners of a people contribute in a remarkable degree to the opinions entertained respecting suicide, and to the frequency of it among them. Of the influence of the laws on self-destruction, sufficient proofs have been furnished in recent times; and the restraints formerly imposed by them, upon minds insufficiently influenced by rational views of religion, being now in a great measure removed, this crime has become much more common, and has assumed an importance equally great, in a moral and social, as in a strictly medical, point of view.

567. The *Ancients*, in general, condemned suicide, unless on occasions calculated to benefit the common weal. Several stoical writers, however, attempted to justify it by reasoning and by their examples, whilst the opinions of others respecting it were either contradictory or insufficiently expressed. *Legislation* regarding it was formerly, and still remains, very different in different countries; it being in some places allowed by the laws, in others tolerated only in certain circumstances, and in some condemned as a crime. The *Christian religion*, of whatever sect, and the doctrines of the Koran, regard it amongst the greatest of sins; whilst it is permitted, or even encouraged, by numerous pagan rites. At the present day, the *opinion* *, by no means generally received, although very commonly acted upon in this country, that suicide is always an insane act, leaves every member of the community at liberty, without any degrading penalty attached to the act, to dispose of his own life as he pleases, without reference to the claims of those depending upon him, or of society in general. The knowledge that no indignity will result to his body, and no discredit to his memory, thus becomes an incentive to self-destruction; and, even when it is not an incentive, it cannot, at least, impose any restraint upon an impulse to commit this act, when a weak-minded person is subjected to chagrin, passion, and misery.

568. That suicide is frequently, or even generally, caused by some one or other of the numerous forms of insanity, may be admitted; but that it is thus occasioned in all cases, is not so manifest. It may be said, that it is an act of moral insanity; and, as far as immorality and passion may be viewed as temporary insanity, so far may it be considered as such. But that it alone constitutes insanity, or that, in a considerable proportion of the cases of it, — especially those wherein mental sanity has been disputed, — the mind is disordered even to the extent contended for, in respect to the forms of moral and partial insanity described above, is not so evident. That the mind is impaired, and the judgment so far weakened, as to be swayed by morbid feelings and impulses, or to be unable to withstand the suggestions of passion and chagrin, may be allowed; and, as far as a weakness of mind, permitting the impulsions of passion their full career, may be considered as insanity, so far may suicide be viewed in this light. We observe the mind of the petted and spoilt child to have the weakness and susceptibility natural to the early stages of its developement increased by the indulgence, and remark the effects produced upon it, when a desired object is withheld. In like manner, the adult mind, unexercised and imperfectly strengthened by opposition and disappointments, and pampered by enjoyment and success, experiences a sudden revulsion upon unexpected reverses or indignities, is thereby irritated as well as depressed, and accuses itself or Providence, — the impulses excited by these feelings being sometimes carried into effect before the sober dictates of reason can withstand them; or these impulses more or less quickly overthrow the efforts which reason may make. In most cases, these efforts are too feeble to counteract the impulses arising out of outraged feelings, or to subdue the sufferings of wounded self love, or the stings of injured honour. The mind, already weakened by indulgence, is the easier overwhelmed by these emotions, the more intensely feels the shock, more quickly sinks before it, and is the less capable of making an effort to recover itself, the less it is swayed by the dictates of religion and principle, and the less it is deterred by fears of any indignity, or of the reprobation of opinion. All these sentiments come in aid of the mind in adversity, or during contrarieties, when duly regulated, although weakened, and conduce to a healthy moral reaction; but they can have no influence where they have never been habitually entertained.

569. i. Occasions of Suicide. — *A. The exciting causes, or the circumstances determining self-destruction*, are very diversified. Whatever may be the motives or incentives to this act, they promise to the imagination something preferable to life, or a lesser evil than existence. — 1st. Suicide may be committed in circumstances, or with motives, calculated to excite admiration, or, at least, to preclude the imputation of blame; but such occasions are rare; and although not infrequently recorded in ancient history, they rarely or never occur in modern times, or in the present state of society. — 2dly. Suicide is often caused, in some countries, by religious rites or institutions, by received notions respecting injured honour, and by hopes of thereby passing into a happier state of existence. — 3dly. It is very frequently occasioned, in barbarous communities, by a species of nostalgia, by forcible removal from home, or by slavery, and by ill-usage, in connection with a belief of thereby returning to former abodes in another state of existence. — 4thly. It occurs very frequently during delirium and mania, — in consequence generally of some illusion, false percep-

---

* In respect of suicide, opinion is as strong as a legislative enactment, inasmuch as it determines the coroner's jury as to their verdict, — this act being always found by them as that of insanity.

tion, or error of judgment. — 5thly. During melancholia, it is very commonly attempted; and the idea of committing it is generally entertained long before it is perpetrated. — 6thly. It is sometimes also attempted in almost all the other forms of partial insanity, and particularly those attended by depression and anxiety respecting a state of future existence, or by unsettled views of religion. — 7thly. Suicide often is suggested by the emotions consequent upon reverses, wounded self-love, chagrin, and contrarieties of all kinds; and by the violence or intensity of passion and anger: the enraged feelings, being incapable or unable to exhaust themselves upon the object which excited them, recoil upon themselves, and often thus originate a suicidal impulse, which is not always successfully resisted. — 8thly. A suicidal suggestion may arise from various circumstances of a negative or passive kind, — from satiety, from ennui, from the want of excitement, from the excess of gratification, and the exhaustion of all its sources, &c. In such circumstances, the idea may long be entertained, and, ultimately, either carried into effect, or laid aside, from a change in the mental or physical state of the individual. — 9thly. It may proceed from a mental infection or sympathy, — from the details, contained in the public caterers to the gratification of the more debased of our moral sentiments, of various modes or instances of self-destruction, — and from a desire, during states of chagrin or disappointment, of obtaining notoriety by the manner of carrying it into effect. — 10thly. It is often committed in order to avoid public exposure and ignominy, or punishment of a severe or lasting kind. — 11thly. It is more rarely had recourse to, in order to escape from violent pain, or the various miseries attending want and destitution, and from feelings of despair. — 12thly. From remorse or self-reproach. — 13thly. From a morbid or insane impulse, without any other obvious mental disorder. — 14thly. From a species of fascination, — as when looking down from great heights. — 15thly. By weak minds in a state of irritation and chagrin, in order to injure the feelings, to occasion regrets, and thereby to revenge slights or contrarieties on those who caused them. — 16thly. Suicide may be mutual and reciprocal, caused by the same feelings, and by the same or different means. — 17thly. It may follow murder. — 18thly. It may be simulated. — Certain of these require further remark.

570. *a.* The instances of self-destruction or of self-devotion caused by patriotism, or by a wish to benefit the community, or to escape dishonour, have been generally viewed as precluding blame, and as hardly deserving to be ranked as suicidal. The cases of Codrus, of Decius Mus, of Curtius, of Otho, of the citizens of Calais and of Rouen, may be referred to as being of this kind. Zeno and his followers inculcated, that a wise man should be ever ready to die for his country or his friends: and the Stoics in general taught, that suicide was preferable, not only to dishonour of any kind, but even to the enduring of severe pain, or lingering disease. Amongst the Greeks and Romans, self-destruction was preferred by many to subjection to a victor, or to a state of slavery. Isocrates, Demosthenes, Brutus, and Cato terminated their own lives rather than fall into the hands of conquerors.

571. Theoxena and the virgins of Macedon committed suicide to escape dishonour; and numerous instances of a similar kind have occurred in ancient and modern times. Lucretia would not survive the dishonour she could not prevent. Lycurgus and Charondas sacrificed their lives in order to maintain the inviolability of their own laws and institutions. Most of the above instances of suicide may be viewed as precluding blame, and some of them may claim our admiration. But other instances, committed on less laudable occasions, have been considered as excusable by Montaigne, Dr. Donne, Rousseau, Hume, and others. When Josephus, who commanded the Jewish army, wished to surrender to Vespasian, from a conviction of the hopelessness of resistance, his soldiers insisted upon their having recourse to suicide rather than to yield to a conqueror. But he resisted their importunities, and concluded his arguments by observing that "self-murder is a crime most remote from the nature of all animals, and an instance of impiety against God our Creator."

572. *b.* The victims of religious rites, as in India, and in the Canaries in former ages — of national customs and manners, as in the isle of Ceos, Japan, &c. — and of ignorance — and of those persuasions which constitute a part of religious belief, also, — are not be viewed as instances of suicidal insanity, but as proofs of the influence of high moral and religious considerations and expectations, of the tyranny of custom, and of false notions of honour; and they result legitimately from the training or education of the mind from an early period of its developement. They are altogether different from the suicides which were so frequent during the decline of Roman greatness, and which proceeded chiefly from vice and licentiousness, or rather from the sentiments and impulses which are generated from these sources — sources so productive of suicide in some countries at the present time.

573. *c.* Suicide in states of *mania*, or of *delirium*, occur either from some involuntary or blind impulse, or from some delusion, hallucination, or false perception, — as when a person, in either of these states, throws up the window of his room, and walks out of it, in the persuasion of his going out at the door. Maniacs also attempt to destroy themselves at the commencement of the malady, under the influence of the moral despair which caused it; and others commit the act from the distress caused by a knowledge that the disease is approaching or is returning. A patient for whom I was consulted during an attack of mania, from which he recovered, experienced, after a time, similar symptoms to those which ushered in the former attack. His friends were directed to take the necessary precautions regarding him; but these he eluded, and committed suicide. This act is occasionally also attempted during convalescence from mania, in consequence of reflecting upon the excesses committed during the attack. It may even be accidental, owing to attempts at escaping from restraint or seclusion.

574. *d.* In *melancholia* and *monomania*, suicide is occasioned by illusions, or by the violence or intensity of some passion or sentiment, or by a sudden impulse which reason is incapable of restraining, or which induces the act before reason can be exerted, as more fully explained above

(§ 91, 92.). In some cases, the morbid impulse is partially or fully carried into effect; and either in consequence of the nature of the means of self-destruction employed, or of reason having at last come to the rescue, attempts are made by the individual himself to counteract them; these attempts either succeeding or not according to circumstances. The suicidal impulse is occasionally developed in an early stage of congestion of, or of inflammatory determination of blood to, the brain; and either previously to, or contemporaneously with, such impulse, insane delusions or acts may be manifested. If, in such cases, the means of destruction shall have the effect of removing the morbid physical condition before extinguishing life, the patient will make efforts at self-preservation. This is not infrequently the case, when suicide is attempted by dividing the vessels in the neck. When self-murder is resorted to, during melancholia, from a fear of becoming insane, and with the feeling that it is the patient's fate or destiny to commit it, the conviction is sooner or later completely verified. Indeed, when it is contemplated or attempted in any form of partial insanity, the intention is generally persevered in, although it may be variously concealed, until it is accomplished in one way or another.

575. In melancholia and other states of partial insanity, or even previously to any symptom of insanity being sufficiently prominent to attract notice, or in consequence of some mental shock or perturbation, the patient may conceive that an internal voice calls upon him to commit suicide, and may act in conformity with it; or he may entertain the idea long afterwards, either without being able to divest his mind of it, or resisting the impulse to perpetrate it with the greatest difficulty, and with the utmost exercise of his reason. A lady consulted me on account of headach, during which she could not look upon a knife without experiencing a strong desire to use it against her own life; but her reason had always resisted the impulse, which disappeared after treatment. In such cases, if medical and moral means be not appropriately employed, and often notwithstanding the aid of both, the morbid impulse is ultimately carried into effect. Amongst persons who have been but little accustomed to self-control, or to listen to the dictates of moral and religious principles, such impulses are often soon acted upon. M. Esquirol furnishes several instances. A monomaniac, he states, heard a voice within him say, "Kill thyself, kill thyself!" and he immediately obeyed the injunction. This writer remarks, that he has never known an instance of suicide from an irresistible impulse, without some secret grievance, real or imaginary, serving as motives to the suicidal propensity. There are few states of *partial insanity*, that may not be attended, or followed, by this propensity. Of the delusions which characterise melancholia, there are none more productive of self-destruction, as Dr. Darwin has remarked, than the fear of future damnation, and of present poverty.

576. *e.* Suicide may be committed under the influence of *passion*, of *violent anger*, or of *self-accusation or remorse*. When intensely excited by anger, the mind, for the time, is in a state truly maniacal; and acts of violence to others, or to the person himself, may be committed in the height of the paroxysm, according to the nature of the circumstance or occurrence causing the excitement. Suicide from this cause is most likely to be the fate of those, who have not been sufficiently taught to curb their feelings, and who have been improperly indulged in early life — as Childe Harold describes himself, —

> "My brain became,
> In its own eddy boiling, and o'erwrought,
> A whirling gulf of phantasy and flame:
> And thus untaught in youth my heart to tame,
> My springs of life were poisoned."

Remorse and self-reproach frequently lead to self-destruction, as the only mode of escaping from the enduring agonies they occasion. The passions which "madden to crime" are often followed by the most anguishing feelings of self-accusation, which not infrequently arm the hand of the sufferer against his own existence. Shakspeare has powerfully and naturally illustrated this state of mind in his delineation of the character of Othello. The victim of remorse is often haunted by dreams, from which he awakens in a state of frenzy, or of delirium, in which attempts at suicide are sometimes fully carried into effect; and in his waking hours his mind is haunted by recollections which become his domestic Furies, and lash him on to madness. "Sua quemque fraus," says Cicero, "et suus terror maxime vexat; suum quemque scelus agitat, amentiâque afficit; suæ malæ cogitationes conscientiæque animi terrent. Hæ sunt impiis assiduæ domesticæque Furiæ." But, whilst remorse thus leads to suicide, by at first more or less obviously disordering the mind, this act as frequently is the proximate result of the moral sentiment; the attempt, or the commission of it, being preceded by no other morbid manifestation of mind than the moral torture proceeding from the consciousness of having committed a crime, great either in itself or in relation to the various circumstances connected with it.

577. *f. Reverses, mortified pride*, impatience under misfortune, and *disappointments*, are frequent causes of suicide, especially in commercial countries, and under free governments, where there is a constant straining, amongst the more educated classes, after wealth, honour, and other direct or indirect means of power. Many of the ancient as well as modern instances of self-murder are to be attributed as much to the effects of reverses and mortified pride upon the mind, as to the higher motives to which this act has been referred. The suicides of Brutus, Antony and Cleopatra, and of Petronius and Sardanapalus, may be viewed in this light. Instances of self-destruction from mortified pride, consequent upon the failure of attempts at becoming conspicuous at public meetings, in the senate, or at the bar, or even upon the boards of a theatre, are not rare in modern times. The passion for notoriety too frequently entertained by silly or weak persons, when suddenly or rudely humbled, is often followed by a state of extreme mental collapse or depression, which sometimes terminates itself in suicide. The shock produced by the failure of long or warmly cherished hopes, of whatever kind, either suddenly overwhelms all efforts of reason and judgment, — the suggestions and impulses of passion and feeling being followed without control, — and thus induces at once a state of moral insanity as harbingers of the

suicidal act, or more slowly and surely developes some one or other of the forms of mental disease above described. In either case, the entertaining of the idea of self-destruction is an indication of insanity, inasmuch as it is connected with, or dependent upon, an overthrow of reason and judgment in the one, and a manifest disorder of mind in the other. But, in many instances, the act is perpetrated after the first shock of a reverse or disappointment has subsided — after reason has resumed her sway, and has been more or less exerted in calmly combating the feelings and suggestions, which such reverse may have called into activity. In these cases, the suicidal act is the result of a weighing of the present and consequent misery — of the wretchedness attending upon existing and prospective emotions, against the contingencies following the commission of this crime; and whatever of insanity may be present, consists only of the excessive emotions which reverses occasion, relatively to the strength of moral and religious principles by which they are, or should be, controlled. Hence it follows, that a number of suicides are committed after disappointments, losses, &c., in a state of mind not absolutely amounting to insanity — during an impatience under misfortune, unrestrained by these principles, owing either to their weakness or absence. Various kinds and grades of disappointment or misfortune will lead to the commission of this crime, according to the susceptibility of the mind, the early education, the previous trials and tutoring of the understanding, the preceding career of success or amount of distinction, and various accessory circumstances connected with existing states of society and manners. The most common, however, are losses of fortune or of reputation, losses from gambling or from transactions of this description, moral and worldly humiliations, disappointed affection, and the losses of friends, — several of these being combined in their operations upon the mind.

578. *g*. One cause of suicide, of no infrequent occurrence in the present state of society, has been insufficiently considered by medical as well as psychological writers: this is, the *satiety* and *ennui* consequent upon excessive sensual gratifications, felt by minds imperfectly, or viciously educated, and unaccustomed to those pains, privations, and contrarieties of life, that impart happiness to the enjoyments by which they generally are sooner or later followed. Continued and excessive gratifications destroy the susceptibility and excitability of the nervous system, and exhaust its manifestations. The languor consequent upon enjoyment is not allowed to subside, or to be succeeded by renewed vigour, before the indulgence is repeated; and as languor and exhaustion increase with the repetition of the gratification which occasioned them, so the desire of escaping from these unpleasant sensations becomes also increased, and the want of varied and augmented excitement is experienced. Thus gratification begets desire, and desire calls for gratification, until all its sources are exhausted, all its varieties and grades are enjoyed; and the sated mind, no longer finding objects capable of exciting it, or of enabling it to emerge from the languor or depression consequent upon inordinate enjoyment, and deriving pleasure no more from the numerous sources which afford it to better regulated minds, feels most bitterly that "all is vanity and vexation of spirit." In the career of gratification, moral and religious principles are gradually at first departed from, and ultimately altogether despised; and once the mind is no longer able to receive enjoyment from the usual means, and has exhausted all the sources of it, within its reach, it has also approached the lowest grade of moral degradation, which either takes refuge in suicide, or is ready to have recourse to it, in moments of deep depression, or on occasions of severe contrariety or disappointment. The restraining influences of principle, and of regard to reputation, have ceased to influence the conduct; and, as soon as the continued and varied indulgence has exhausted vital and mental power, and dried up every spring of enjoyment, circumstances which depress, or vex the mind, will often give occasion to suicide, or suggest it; or the mind, no longer being capable of gratification, entertains at first the idea of suicide, and ultimately has recourse to it, in order to escape from the misery of the extreme languor which it is incapable of dissipating.—Whilst most of the causes of suicide, and especially those already noticed, are of an *active* kind, this may be viewed as altogether *passive*. Whilst the *former* act by violently exciting and disturbing the mind, the *latter* results from a defect of such excitements as will rouse it, and afford those gratifications, without which it either cannot exist, or prefers not to exist at all.

579. It has been said, that a Society for the mutual Encouragement of Suicide exists in Paris, the members of which undertake to terminate their own existences when life becomes insupportable; and the circumstance is almost verified by the character of the prevailing literature, and of the drama, in that capital. Numerous are the instances, not only throughout France, but also in this country, of persons who, having run an unbroken and rapid career of sensual gratification, and either exhausted its sources or their own means of enjoyment, have therefore put a period to their existence without any further reason, and without any previous proofs of their insanity beyond the inordinate indulgence of their desires and passions, and the predominant sway these had obtained over all their sentiments and actions.

580. *h*. Closely allied to the preceding is the occurrence of a *morbid* or *irresistible impulse to commit suicide*, without obvious mental disorder, or any moral cause sufficient to account for the act. Suicides of this kind occur most frequently in persons belonging to families hereditarily prone to insanity or suicide; and hence, in some instances, may be viewed as the first manifestation of the mental disorder. But they likewise are committed by persons who are not thus predisposed, and under circumstances which require a brief examination. — 1st. From a species of *mental sympathy or infection*, caused by perusing the details of cases of suicide furnished so circumstantially, and injuriously as respects the minds of the community, by the weekly and daily press. Instances are often occurring, of not one only, but of several suicides being committed during the first few days following the publication of some notorious case of self-murder — notorious as respects either the rank of the individual, or the mode of perpetrating it, or other circumstances connected with it. Such instances have been long remarked, and are of

increasing frequency owing to the existing state of society, of which some notice has already been taken (§ 272. 320.), and to which a brief reference will hereafter be made.—2dly. Suicide is, in rare instances, perpetrated from a species of *fascination*. The very knowledge of having in hand the means, or by a single step the power, of self-destruction, may give occasion to the impulse of committing it, which may even be instantly carried into effect by the weak, susceptible, or the morbidly disposed mind. I have had, on several occasions, to prescribe for highly nervous persons — those labouring under a morbid sensibility of the nervous system, and anxious susceptible states of the moral feelings — who could not handle a razor or sharp knife without being distressed by the desire or the idea of attempting suicide. Such persons, also, are unable to look down from great eminences, or over a precipice, without experiencing a desire of throwing themselves headlong. Byron has noticed this feeling, and ascribed it to

> " The lurking bias, be it truth or error,
> To the *unknown;* a secret prepossession,
> To plunge with all our fears — but where ? you know not,
> And that 's the reason why you do — or do not.

The bias to the unknown, here noticed by the poet, has little or no influence in originating this singular feeling, which is sometimes experienced by persons, both physically and morally sane, as well as by the weak in mind and body. This desire or impulse to precipitate one's self, when looking downwards from a very high precipice, obviously arises from no process of reasoning. Probably the suggestion of contrast may be concerned in producing it; and something may be owing to the unusual impression made upon the mind through the sense of sight — to the nature of the sensation itself. That this sensation is even pleasurable, — that it is attended by a sort of fascination,— is admitted by those who have experienced it; and, with many persons, the desire is so strong as to require the active exertion of reason to overcome it. That it causes a physical as well as a moral effect, — that it affects the circulation in, as well as the manifestations of, the brain,— is shown by the vertigo which accompanies it, and which often occurs without the desire of self-precipitation or destruction. Indeed, I doubt much, whether or not the feeling produced in the mind by this impression on the sense of sight is *primarily* attended by such a desire. It would seem, that the sensation is pleasurable, and that it excites a desire to throw one's self headlong in the gratification of it. But reason immediately dictates, that this act would be attended by self-destruction; and from this the sane mind recoils with a shudder — recoils from the consequences of enjoying the feeling which the nature of the sensation had thus suggested. This subject, although noticed by Falret, Andral, and others, has not been hitherto investigated with reference to suicide. But it is not improbable, that persons who have entertained the idea of self-murder, and yet have not been able to summon resolution to commit it, knowing the influence of the sensation of looking down from a precipice upon the mind, have had recourse to it, in order to aid their weak resolves. Others, probably, in states of high susceptibility and extreme weakness of the nervous power, have followed the impulse or fascination thus produced, before reason had time, or recovered power, to counteract it.

581. *i.* Suicide may, under certain circumstances, become almost *epidemic*. Indeed, an epidemic prevalence of the act has been noticed, without any other causes, besides those just stated, to account for it. Sydenham has mentioned such an occurrence, and others have taken place in more recent times. During the atrocities of the French revolution, — atrocities the most humiliating in the history of the human mind, — the " damned spot" in the annals of France, which neither her science can obliterate, nor her military glory can conceal, — suicides were most prevalent, owing to a variety of causes, and often to a combination of circumstances and feelings, — the loss of honour, fortune, and friends; the impulses of passions, and of remorse, despair, &c. The frequency of suicide at certain periods, and in particular places, is caused chiefly by political changes and by commercial crises, affecting the position of numerous individuals in society, mortifying their pride, and changing their prospects. Something, also, may be imputed, on certain occasions, to *mental sympathy* or *imitation*, and somewhat even to a passion for *notoriety;* but impatience under misfortunes and disappointments is the most common cause. M. Andral states, as proving the influence of imitation in causing suicide, that one of the inmates of the " *Invalids*" was found hanged in a particular corridor. Two days afterwards, a second was found in the same place; then a third, and even a fourth. This corridor was shut; after which no more hanged themselves. He further remarks, that, not long ago, it was the fashion for people to throw themselves from the top of the column in the Place Vendôme. This was, however, only a fashionable mode of committing an act which is always common in Paris, and which was not the more frequent because this mode was preferred to the other means more usually adopted. It has often been noticed, in most civilised as well as uncivilised countries, and particularly in communities closely associated by feelings and interests, as in regiments, &c., that a single instance of self-murder is soon followed by many.

582. *k.* Self-murder has been often perpetrated in order to *escape exposure* and *punishment* consequent upon detected crimes. Indeed, this is one of the most common moral causes of suicide in this and other civilised countries, and instances of it are of daily occurrence. Many of the actors, and prime movers, in the unprecedented atrocities of the French revolution, committed or attempted suicide, when they came in their turn to experience a direful retribution. Criminals of all grades, from the petty depredator to the state delinquent, have sought refuge in self-murder, from the accusations of conscience, the shame of exposure, and the extreme wretchedness attending conviction and the last penalties of the laws. — Detection of, as well as remorse caused by, *conjugal infidelity*, has been followed by suicide. In the one case, this act is resorted to in order to avoid the exposure and shame consequent upon detection, although remorse influences the mind in part to form the resolution; in the other, self-reproach is often the sole cause.

583. The desire of escaping from *moral* or *physical pain*, or from *anticipated* or *impending want*, is not infrequently productive of self-de-

struction. Under this head may be comprised *seduction*, and *despair*, however produced. How numerous are instances of suicide caused by the despair consequent upon seduction, the desertion of the seducer, and all the contingent miseries, heightened by the fears and anticipations of the seduced, by the desertion of friends, and the scorn of society. *Physical pain* is much less frequently a cause of suicide, than moral suffering. Many, however, of the ancient Stoics put an end to pain by terminating their lives, — thereby following the example of Zeno, the founder of their sect; and several Romans have been mentioned by Pliny and others, as having adopted this course. Dr. Haslam states, that a gentleman destroyed himself to escape from the tortures of gout. I have been told by several persons that, whilst suffering the pangs of neuralgia, it required the utmost efforts of their moral principles to restrain them from perpetrating self-murder. Numerous instances are on record, of persons who, having believed themselves suffering incurable maladies, have had recourse to suicide, as a more pleasant mode of dying; this crime being committed by them under the impression that a natural death is more painful than that inflicted by themselves. It has, however, been long known, and shown by Hufeland and W. Philip, that death from disease, even when the mental faculties are retained to nearly the last, is attended by a gradual abolition of the general sensibility that is by no means painful or distressing; the patient ceasing to exist as happily and calmly as when falling asleep, unless under peculiar circumstances.

584. *l.* Suicide is often committed in *states of irritation and chagrin*, particularly by persons of a morose, splenetic, or irritable temper. It is sometimes suggested to such persons by a desire to excite regrets or self-reproach in the minds of those who have offended them, — by a feeling of *revenge*. Most of the suicides committed by *children* are caused by a desire of this kind; particularly when they follow punishment of any description. Self-murder arising from *jealousy*, also, depends chiefly upon the promptings of this feeling, in connection with anger; and is most apt to occur in *hysterical*, *nervous*, or *weak-minded females*. Some years ago, I was present at an evening party, where a young lady, engaged to a gentleman present, was seized with hysterical convulsions, in consequence of his attention to another. Upon recovering from them, she suddenly left the house, without the direction she took being observed. The following day she was taken out of the Canal near the Regent's Park, in her ball-dress, — she having gone upwards of a mile in order to carry her design into execution. A lady, on a similar occasion, took a large quantity of laudanum. The usual means of restoration producing no effect, I was sent for: she was ultimately recovered by the affusion of cold water on the head.

585. *Domestic contrarieties* and *misery* — the frequent recurrence of petty vexations — the tyranny of intimate connections, and the positive ill-usage of others — suits in courts miscalled those of *equity*, on the *lucus a non lucendo* principle — may, from their continuance, severity, and repetition, especially under aggravating circumstances, and in states of high susceptibility in the unhappy sufferer, drive even the strong-minded and the well-principled into a state of temporary despair or desperation — may fire the brain to madness, during which self-destruction may be attempted. A most talented and accomplished young lady, suffering from a combination of the above circumstances, took, upon retiring to rest, and with a suicidal intention, a very large quantity of laudanum, — more than is usually productive of a fatal effect. She wakened late the following day, with a most distracting headach and general disorder, recollected the act of the previous night, regretted the attempt, and sent for medical aid — determined, however, to conceal the cause. Her health, from this and the other circumstances alluded to, continued greatly impaired for many years, and several physicians were consulted. She came under my care, and at last mentioned the suicidal attempt, which was never further divulged. She now continues, in good health, to ornament the society in which she moves. M. Falret mentions, among other causes of chagrin producing suicide, that of having been calumniated; and he states, that a considerable number of persons commit this act chiefly with a desire of vindicating their reputation, — no other means of vindication being in their power.

586. The *state of desperation*, into which a person influenced by the *passion of love* may be thrown by disappointment, is actually that of insanity — at least, of moral insanity. A gentleman endeavoured to obtain the favourable notice of a lady, of whom he had become enamoured, but had not succeeded. He committed suicide by opening a vein in his arm, and, whilst the blood was flowing, he wrote a note with it, acquainting her with his act. She was soon after attacked by nervous fever, which was followed by insanity, during which she fancied that she heard a voice commanding her to commit suicide. Other instances of a similar kind may be adduced.

587. Some persons, during *intoxication*, have a remarkable disposition to commit self-murder. This disposition may be the consequence of either habitual or occasional intoxication; and it is sometimes connected with *delirium tremens*, or, rather, depending upon the illusions attending that disease. Some persons, who have received, at a former period of their lives, severe injuries of the head, experience this disposition, when even but slightly affected, in other respects, by intoxicating liquors — especially if they suffer any contrariety or opposition at this time. Cases of this kind have been noticed by M. Falret, and others, and by the author.

584. *m.* Instances of *mutual or associated suicide* are not rare, particularly in recent times. The self-homicides of Lucius Vetus, Sextia, and Pollutia, during the reign of Nero, and of Sardanapalus, may be noticed amongst the many instances recorded in ancient history. During the French revolution, and the wars consequent upon it, associated suicides were frequent. Nine conscripts who had concealed themselves, having been discovered, determined to destroy themselves rather than serve: they drowned themselves together. The most common causes of this mutual crime are, opposition on the parts of parents to the fulfilment of marriage engagements entered into by young persons, want or disappointments in the married state, and family dishonour. The bodies of two young persons were found in

the Seine, with a piece of paper attached to them, testifying to their ardent affection, and that they perished together that they might be eternally united. Occurrences of this kind are, however, not unfrequent in this and other civilised countries; and instances are not rare of lovers committing mutual suicide, even where there was no opposition to the consummation of their wishes. In this latter case, some cause of chagrin or disappointment has occurred, and maddened the mind already disordered by one dominant passion, — the suicidal intention entertained by either being adopted by the other. From the accounts of several cases of mutual suicide attempted in recent times, there is every reason to suppose that the attempt was merely *simulated* by one of the persons who had agreed to commit this crime; and that it had been contrived entirely with the intention of getting rid of an object no longer one of endearment. This is more likely to be the case, when a young woman has become pregnant by one of those drunken debased workmen who prey upon females in large or manufacturing towns. This and similar instances have appeared in the public prints. A man out of work, and his paramour, having agreed to commit mutual suicide, procured some laudanum (about four ounces), and divided it into two equal quantities. The man proposed that they should turn back to back whilst taking it, in order that they might not falter in the act. The female died soon after; but the man did not appear to be affected. From the evidence at the inquest, it did not appear that he had actually entertained an intention to destroy himself, or had taken any of the laudanum. Analogous cases have occurred, where drowning has been the mode of carrying the suicidal act into effect; one of the parties having escaped.

589. Want and other causes of distress, and even more petty grievances, may, in states of mind but little influenced by moral and religious principles, induce husband and wife to commit mutual suicide. In the present state of society, especially in Paris, where the passions are roused and excessively gratified before reason and judgment are informed — where sensibility is exhausted at an early age, by the excitement of sensations, in great variety, in rapid succession, and increasing intensity — where the thirst for pleasure is promoted by a loose and stimulating literature — and where the end of enjoyment is generally shown, in the pages of the novelist and in the scenes of the dramatist, to be murder and suicide, — instances of associated self-destruction, even among persons in no way dependent upon each other, have not been rare. Young men, who have exhausted either the means or the power of enjoyment, or both, in the career of vicious indulgence, and unrestrained by principle and by fear, have followed the example held out to them by the popular writers of the day, and "shuffled off this mortal coil" in the most dramatic forms they could devise. Two young men entered a *restaurant;* ordered an expensive dinner, with costly wines, without the intention or the means of paying for it; and soon afterwards committed suicide together. On a table in their room were found written papers, expressing aspirations after greatness without either labour or care, and contempt for those who could live by their own exertions, with sundry quotations from Victor Hugo and other exciting writers of the day. The whole was terminated by a request that their names and the manner of their deaths might be sent to the newspapers! Sensation is the object and end of living, with many, in the present day; and when it can no longer be excited, — at least, to the pitch, or in the tone, capable of yielding enjoyment, — life is relinquished in such a way as is most likely to excite the sensations of others.

590. *n. Murder* is often committed first, and *suicide* afterwards, prompted by the same or different motives. — *Jealousy* is one of the most frequent causes of this combination of crimes, which, however, may be prompted by a variety of circumstances, — indeed, by all which occasion suicide or insanity. The following instances are fully detailed by Mr. Winslow: — M. De Pontalba, whose son was a most distinguished officer, and married to a most extravagant woman, saw with distress the ruin she was bringing upon him. In order to save the son, the father shot the daughter-in-law, and afterwards himself. — A gentleman of London was married in the country to the object of his affections. He had drawn the charge from his pistols the previous night, but his servant had loaded them again the following morning without acquainting him. After the ceremony he took up one of the pistols, which he knew he had unloaded the night before, and playfully rallied the lady on her cruelty, saying, "You shall die, you tyrant! you shall die with all those instruments of death about you — with that enchanting smile, those killing ringlets of your hair?" — "Fire!" said she, laughing. He pulled the trigger, and she was shot dead. He called up the servant, and, upon his entering, locked the door, and inquired if he had loaded the pistols? "Yes," was answered; on which his master shot him with the undischarged pistol. He wrote * to his wife's father, explaining the calamity, and then threw himself upon his sword.

591. Instances are not rare, of a parent or parents, influenced either by want, or by homocidal monomonia, killing their children, and then committing suicide. Although extreme wretchedness is sometimes the chief occasion of these occurrences, yet it is seldom the only occasion. More frequently some form of partial insanity is either the principal or concurring cause; some circumstance having occurred to excite the homocidal propensity. Dr. Gall mentions the case of a soldier, of whose wife an officer had become enamoured without succeeding in his wishes. The soldier appeared dejected and morose, but the following day appeared quite tranquil. A few days afterwards, he and his wife attended the confessional and took

---

* The letter will show the state of mind produced by causing the death of a much-loved object, particularly as leading to suicide. This gentleman had written immediately upon the performance of the ceremony, and had concluded the note as follows: — "The bride gives her duty, and is as handsome as an angel. I am the happiest man breathing." This soon afterwards was written: — "Two hours ago, I told you truly that I was the happiest man alive. Your daughter lies dead at my feet, killed by my own hand, through a mistake of my man's charging my pistols unknown to me! I have murdered him for it. Such is my wedding-day. I will follow my wife to her grave: but before I throw myself upon my sword, I command my distraction, so far as to explain my story to you. I fear that my heart will not keep together till I have stabbed it. Poor good old man, remember that he who killed your daughter, died for it! In death, I give you thanks, and pray for you, though I dare not pray for myself. If it be possible, do not curse me. Farewell for ever!

the sacrament; they dined in good spirits, and went out to walk; he expressed his strong affection for her, and inquired if she had made a full confession to the priest. He then plunged a poniard in her breast. He repaired to his house, and seizing his children, killed them with a hatchet. He afterwards went to the main-guard, and deliberately detailed the whole particulars, concluding with the words — "Let the officer now make love to my wife, if he pleases!" He then stabbed himself to the heart.

592. *o.* Suicide is often *simulated*, with a view of obtaining a desired end; — the lover threatens or seems to attempt it, to induce a return of his affection; the spoilt child, to obtain a compliance with his wishes; and the indulged wife, submission to her caprices. In such cases, either a small portion of laudanum is usually procured, and this is diluted with some fluid, to increase the apparent quantity; or a large quantity is taken, when seen by some person, or when instant aid may be obtained. Females have resorted to this plan, to try the affection, or to compel the fulfilment of the engagements, of their lovers; but, in cases of this kind, little more is necessary to be known, than that such acts are sometimes resorted to; and that a poisonous dose may be actually taken, in order to appear the more in earnest, knowing that assistance is near, and that it will be successfully employed. Drowning even may be feigned in similar circumstances. I have, however, seen two cases, in which fatal results very nearly followed this experiment upon the endurance of affection.

593. *B. Predisponent circumstances.* — Besides the above *exciting* occasions of suicide, others, which powerfully *predispose* the mind to their influence, and to which attention has been imperfectly directed, require to be briefly noticed, — namely, *hereditary predisposition; systems of philosophy and of morals; states of education, of manners, and of society; distracting subjects and studies; irritation caused by difficult and perplexing circumstances; injuries of the head, and physical disease; the influence of climate, of seasons, weather, and states of the air on the nervous system, and of age, sex, and temperament,* &c.

594. *a.* The influence of *hereditary predisposition* in occasioning suicide, is well established. In a very large proportion of instances, either self-murder has been perpetrated by one of the older members of the family, or some form or other of insanity has appeared in one or more of them. Very frequently, one or both parents of the suicide have been noted for eccentricity, or the waywardness, instability, or violence of their dispositions and tempers. Instances have occurred, of the children of a parent who has committed self-destruction, perpetrating the same act when they have grown up, or at later periods of their existence. Even more than one — several — of the offspring have experienced this fatal disposition upon arriving at nearly the same epoch of life as that at which it was committed by their parent. Dr. GALL has observed the suicidal predisposition in several successive generations. I have known it in three generations. M. FALRET considers suicide to be more intimately dependent upon hereditary predisposition, than any other form of insanity; but this is chiefly the case in respect of suicide connected with melancholia and other forms of partial insanity.

595. *b.* The influence of *systems of philosophy and of morals*, in increasing the frequency of suicide, is undoubted. The doctrines of ZENO and EPICURUS encouraged it among the ancients. Since the revival of learning, MONTAIGNE was one of the earliest and ablest of those who favoured the perpetration of this act, but all his arguments are derived from the ancient Stoics. The early writings of Dr. DONNE seemed to favour suicide; but they actually go no further than to show, that contempt for, or even the sacrifice of, life is praiseworthy in the discharge of our duties, and in the execution of beneficent and noble undertakings. The reasonings of HUME, and the indirect support which the doctrine they favour received from the writings of MONTESQUIEU, of ROUSSEAU, of GÖTHE, DE STAËL, and others, probably contributed less, than is supposed, to the increase of this crime. It is, however, not to be disputed, that the loose principles disseminated, and the violent feelings displayed and exerted, by the warm and passionate writings of ROUSSEAU and GÖTHE, promoted this end much more than the metaphysical and moral arguments urged in favour of it. Madame DE STAËL has stated that the *Sorrows of Werter* caused more suicides, at one time, in Germany, than all other circumstances combined. Whatever of mischief has arisen in this direction from modern writings, has been indirect — has proceeded chiefly from the injurious influence exerted upon the mind by an exciting, profligate, and debauching literature, for which the state of society and manners has procured a very extensive circulation; and not so much from the arguments adduced by a few metaphysical writers of more confined, although more lasting, reputations. The poison instilled continually and in wide profusion, into the minds of all classes of the community, through the media of the numerous works of passion and imagination with which the presses of the civilised world at present labour; the taste for their perusal, which numerous circumstances of the times conspire to diffuse; and the moral contamination which they spread, or render still more deep and malignant, most sensibly dispose the mind to suicidal impulses, when subjected to the exciting causes already noticed. That the doctrine of *Materialism*, however, and the general scepticism to which it leads, disposes the mind to suicide, inasmuch as it weakens the belief of a future state of rewards and punishments, cannot be disputed. The *infidelity* so widely diffused towards the close of the last century, by means of the sceptical writings of that, and of a somewhat earlier, period, doubtless, contributed to the frequency of suicide, especially in France, during that eventful epoch; and there is every reason to believe that its influence is still exerted, although to a somewhat less extent than then.

596. *c. Education and states of manners and of society* may be such as to favour, or to counteract, a tendency to self-murder. If *education* be conducted without regard to religious and moral principles — if the knowledge of words, of things, of facts, and of phenomena, be made to supersede sound principles of conduct, and of belief — if the amount of knowledge communicated, rise above, or reach beyond, the sphere of utility and of enjoyment — if, in short, education be conducted in the manner in which I have already shown it (§ 271, 272.) to be generally conducted

in the present day, — it will tend much more to increase the number of our wants, to develope our desires and passions, to augment their intensity and violence, at the same time that it removes from them those salutary restraints which prevent them from becoming dangerous to others or destructive to ourselves. The influence of education thus loosely conducted, upon the *pseudo-liberal* principle of rendering it acceptable to all creeds, — to the Churchman, the Romanist, the Presbyter, the Baptist, the Socinian, and all other persuasions — " to Christian, Turk, and Jew " — proves injurious, not only in the way just stated, but also in giving rise to forced, unnatural, over-reaching, ambitious, and unprincipled states of society; and these states, in proportion as they are developed, are the parents of crime, insanity, and suicide. Throughout the community, and particularly in the middle classes, there is a constant effort to rise above the ranks which Providence has assigned; and to partake of the pleasures and luxuries which are far beyond the means of some, and are conducive to libertinism and profligacy in many of those who enjoy them the most. The end of excessive indulgences, and of debauchery in every form, particularly when early pursued, is suicide or insanity, or the unequivocal combination of both, in many instances.

597. There can be no doubt of the pernicious principles recently inculcated, particularly amongst the lower orders of society, and to which the name of *Socialism* has been given, having already conduced, in several cases, to suicide. This doctrine, inasmuch as it unlooses the ties of society and of consanguinity, as it admits of no moral responsibility, and as it allows no expectations of future rewards and punishments, is opposed to all moral and religious obligations, — it favours vice and profligacy, overthrows all virtuous and salutary restraints upon the feelings, and, by allowing without control the indulgence of the desires and passions, favours what has just been shown to be the ultimate consequences of this course. In this state of society, the endearments of friends, of connections, and even of relations, cease to exist. The ties which bind society together in harmony, are broken asunder; and as soon as the race of selfish indulgence is run, — as the power of enjoyment is exhausted,—the mind, having no affections, no friendships, no self-consoling and truly gratifying recollections to repose upon, at once sinks into a state of abject wretchedness, which it seeks to terminate by self-murder.

598. In illustration of what I have stated, I may adduce what has been advanced by a French writer, in accounting for the frequency of suicide. This writer remarks, that the high civilisation and refinement, the luxury, the clash of interests, the repeated political changes, combine to keep the moral feelings of the Parisians in a state of tension. Life does not roll on in a peaceful and steady current, but rushes onwards with the force and precipitation of a torrent. In the terrible struggle, it often happens that the small minority, which has been elevated high above the multitude for a time, falls down as suddenly as it has risen. The drama of life is full of miscalculations, disappointments, disgust, and despair: hence the numerous suicides. But there are other causes in operation,—and not the least, the remarkable character which romances, plays, and spectacles have assumed. The public taste has undergone a complete revolution in this respect. Nothing is more patronised now at the theatre, than the display of crime unpunished, human misery unconsoled; and a low literature, impregnated by a spurious philosophy, declaiming against society, against domestic life, against virtue itself; applauding the vengeance of the assassin; and recognising genius only as it is seen in company with spleen, poison, and pistols. This writer concludes with appealing to those who read the novels of the present day, and who visit the theatres, whether he has exaggerated his statement; and I may appeal to all in this country, who are acquainted, not only with the state of onr popular literature, and of the stage, but also with the character of the daily, weekly, and even monthly publications, which are hourly devoured by all classes — with their natures and contents, — whether this writer has not underestimated the influence of these causes.

599. *d. Harassing subjects and abstract studies*, especially when undertaken by minds which have undergone an imperfect preliminary course of information and discipline, sometimes occasion so much distraction as to give rise to suicide or some form of insanity. Several instances of suicide have occurred from the pursuit of subjects too abstract either in themselves, or in relation to the power of the individual's mind. In such cases, an extreme state of irritability of temper is often evinced before the suicidal act is attempted. Indeed, the irritation produced by any difficult and perplexing circumstance, as well as by great losses and disappointments, is very apt to terminate itself in self-murder, when experienced by the weak, the indulged, the fortunate, or the undecided and wavering mind. In the present general scramble for wealth, often merely for existence, and as often only to obtain the means of retaining a position falsely usurped, or too sanguinely entered upon, the irritation and distraction which often necessarily result, not infrequently lead on to suicide. The rich man gambles in the funds, foreign or domestic, or in joint-stock shares, or in the prices of foreign and domestic produce, in order to double by a single speculation, what he had slowly acquired by prudence or application. The poor man places his last or only stake, and his own and his family's happiness, upon a contingency not more secure than the hazard of a die. In either case, adverse fortune brings distraction, which reason is not always able to calm. A gentleman, who had acquired a large fortune by a long life of prudent application to business, ventured the greatest part of it in the foreign funds: he might, at one time, have sold with great advantage: but they fell rapidly; and, under the contemplated loss of 70,000*l.*, he terminated his existence. Another, similarly circumstanced, went repeatedly with the intention of selling at a time when he might have gained many thousands. His want of decision prevented him on each occasion from carrying his design into execution: the period of extricating himself had passed; and, in a state of irritation at his loss, and at his wavering state of mind, he committed suicide. But such occurrences almost daily take place; for trading and commercial transactions very generally possess, in the present day, very much of the same gambling character. Even the small capitalist is desirous of investing, or of speculating with, the

savings of years, in some one or other of the numerous schemes, promising large returns, concocted by those who are well aware of the existing passion for gain, and who know well how to turn it to their own advantage, but to the loss, misery, and destruction of their dupes, many of whom, in a state of distraction occasioned by their ruin, commit suicide.

600. *e. Injuries of the head, and physical disease,* sometimes either predispose, or directly give occasion, to suicide. — *Injuries* received at a remote period may give rise to it, without having previously excited any marked state of disease, or even mental disorder; and yet, upon examination after death, lesions of structure have been, in some instances, detected, either in the brain or its membranes, or even in both. More frequently, however, physical disease, often slight, but still manifest, shows itself; or some degree of mental disorder, or some illusion, is evinced, of which the suicidal impulse is only a symptom or a concomitant. In most cases, the injury which originated the mischief, has been so slight as to be considered unimportant by both the patient and his friends.

601. *Visceral disease* has a similar influence in causing suicide, as I have shown it above (§ 309. *et seq.*) to exert in producing insanity. When the abdominal viscera, particularly the digestive organs, are chiefly in fault, hypochondriasis and melancholia are first developed; the disorder of these organs acting upon, or disordering the circulation in, the brain. When the intention or the impulse to commit self-murder originates in primary disease of the brain itself, some form of monomania, or of mania, generally either precedes, or attends it. In most cases of suicide arising from visceral disease, either organic nervous energy has been remarkably depressed by exhausting causes, as by masturbation, drunkenness, and libertinism; or this disease has been only an accidental or concurring cause, — one or more of the circumstances or occasions already noticed having been more or less concerned in producing the suicidal determination.

602. *f. Seasons, weather, and climate* have been generally supposed to exert some influence in disposing to suicide. M. Villeneuve considers that a warm, cloudy, and humid state of the air increased the number of suicides in Paris, Marseilles, and Rouen; and that stormy weather seemed to exert a similar influence. The effect of warm and humid states of the air upon the nervous system is often very manifest, in depressing its energies, in weakening the mental powers, and in lowering the spirits. The greatest number of suicides has been said to occur when the thermometer ranges above 75°. Dr. Burrows observes, that, on examining the tables kept at Westminster from 1812 to 1821 inclusive, and at Hamburgh from 1816 to 1822 inclusive, the number of suicides in both cities was greatest in July, and least in October. A similar result has been remarked in respect of Rouen and Copenhagen. From 1817 to 1826, the number of suicides committed in Paris amounted to 3205; of which 997 were perpetrated in spring, 933 in summer, 627 in autumn, and 648 in winter; the following being the numbers with reference to the months:— January, 213; February, 218; March, 275; April, 374; May, 328; June, 336; July, 301; August, 296; September, 248; October, 198; November, 131; December, 217. — November has been said to occasion greater despondency and despair, and more suicides, than any other month; yet this month, both in London and in Paris, presents the smallest number of self-murders, with the exception of October. Notwithstanding the influence of warmth and humidity of atmosphere, in increasing the number of suicides, this act is much more common in the colder than in the warmer countries of Europe; — France, Germany, England, and Denmark, being the kingdoms in which it is most frequently committed. In the summer of 1806, 60 cases took place in Rouen, and nearly 300 in Copenhagen; the weather being warm and moist. In Berlin, 500 instances occurred in six years and a half; whilst at Naples there was, in 1826, only 7, in a population of 349,000; and in all Spain, in the same year, there were only 16 cases. Dr. Kamptz, of Berlin, has assigned the proportion which suicides bore to the population, in several places in Europe, for the year 1817. I abstract only a few cities: —

Berlin -	57	suicides,	166,584	popul.,	or 0,34 in 1000.
Breslau	58	—	63,020	—	or 0,92 in 1000.
Magdeburgh	50	—	27,869	—	or 1,79 in 1000.
Copenhagen	51	—	84,000	—	or 0,60 in 1000.
Paris -	300	—	700,000	—	or 0,42 in 1000.
London	200	—	100,000,000	—	or 0,20 in 1000.

No just inference, however, can be drawn from returns of the suicides committed during one year only, in different climates or countries; as several circumstances, either uncommon or fortuitous, may have occurred, in one or more of these climates, at that period, to increase or diminish the usual numbers, — as great prosperity or adversity, plenty or scarcity, political commotions or revolutions, &c. — Nor is it to *climate* or *season* that much influence is to be imputed in occasioning suicide; but chiefly to the various circumstances already noticed, in connection with religion, commercial speculation, and states of society. It is sufficiently established, however, that, throughout the most of Europe, and in the United States of America, suicides have become much more frequent than at the above, or at almost any preceding, period, unless during the French revolution. The number has increased in Paris from 300 in 1817, to 511 in 1826; and in Copenhagen, from 209 during 1790, and the four successive years, to 319 during the first five of the nineteenth century.

603. The admitted increase of suicides, more especially in this country, is not to be altogether referred to the more general influence of the several occasions already mentioned; but in a great measure, also, to the increased numbers and circulation of those prints, which abound with the disgusting details of profligacy, crime, and suicide. Dr. Burrows justly remarks, "that the public taste has become more and more vitiated and debased by this species of gratification; and nothing is found so attractive as tales of horror and of wonder; every inquest that is held upon a person who has destroyed himself, being read with great avidity." The ludicrous police reports of criminal acts furnished by the daily panderers to our more debased desires, scenic representations of successful vice and crime, and the constant circulation of suicidal acts in all the periodical prints, serve most essentially to familiarise the minds of the lower classes especially, with these acts, and to diminish

the detestation with which they are generally viewed at first, until the moral sensibility becomes altogether blunted by their perusal. The repeated presentations of these crimes to the minds of the ignorant and vicious,— often not only divested of their attendant horrors, but even clothed in attractive garbs, — readily suggest a recourse to them, in circumstances which cause distress, irritation, or distraction. Literature — if, indeed, the trash vomited hourly from the steam press should be dignified with the name — has become the most debased of modern ways of traffic; and its chief end, in the present day, is to encourage those feelings and desires, by means of which its diffusion and profitable returns may be augmented. In order that this may be the more surely effected, and with the greatest amount of moral contamination to the community, and of pecuniary profit to the writers and proprietors, — that the criminal appetite may be pampered and increased — that each successive meal of criminal indulgence may be followed by a greater relish, and a more craving desire for its repetition, — foreign countries are ransacked to furnish what our own cannot supply in sufficient frequency and piquancy.

604. *g. Age and Sex.*—The frequency of suicide varies at different *ages*. During the early epochs of existence, the sanguine expectations, which are generally indulged, and which soon take the place of temporary despondency and distraction occasioned by disappointments and losses, tend to diminish the number of suicides. In the middle and more advanced periods of life, sensibility becomes exhausted or blunted, whilst cares and anxieties increase in number and intensity; and the attachment to life is much impaired. The desire of life afterwards increases, and frequently in proportion as old age advances. M. FALRET has shown, that it is from 35 to 45 that the greatest number of suicides occur. Of 6782 cases, 678 were under 20 years of age; and of this number, 487 were between 15 and 20, and 181 below the age of 15. A child of nine years old * wished to destroy itself; but this is the only case of so early an age. After 45, suicide becomes more and more rare; and above 70, there are scarcely any instances of it. The father, however, of the celebrated BARTHEZ killed himself at the age of 90; and his son, when he was old, wished to follow his example.

605. Both *sexes* display the suicidal tendency, but the male sex most frequently. M. ESQUIROL considers the proportion of males to females to be 3 to 1; but there are differences according to countries, arising from the greater or less influence of many of the circumstances shown to favour this act. Thus, in France, there are more suicides among women than in Germany. It has been observed, both in England and on the Continent, that nearly two thirds of suicides were unmarried. This state, therefore, is much more favourable to self-destruction than the married condition.

606. *h.* Suicides are most frequent among persons of the *melancholic temperament* and *bilious constitution*, with a pale or sallow, or yellowish complexion, and hard or sharp features. Such persons are more liable than others to disorders of the biliary and digestive organs. But this crime is not infrequently committed by the nervous and irritable, and even by the sanguine and plethoric. Females of this latter constitution occasionally attempt or perpetrate self-murder, just before or during the catamenia, or from some irregularity of this evacuation. M. ESQUIROL states, that the *scrofulous diathesis* is remarkable in a number of suicides.

607. *i.* Several *tables*, showing the frequency of the several *causes* of suicide, have been published; but are obviously deficient in precision, as well as in the truth of the data upon which they are based. Moreover, this act is not generally prompted by a single circumstance, or cause, only; but by the combination, concurrence, or succession of several. With great allowances, and reservation, the following may be adduced, in the absence of more accurate information, as to the comparative influence of the circumstances occasioning this crime. The suicides committed in London, between the years 1770 and 1830, have been stated (*London Med. and Surg. Journ.* vol. v. p. 51.) to be 4337 men, and 2853 women; and the causes have been thus assigned: —

Causes.	*Men.*	*Women.*
Poverty	905	511
Domestic grief	728	524
Reverses of fortune	322	283
Drunkenness and misconduct	287	208
Gambling	155	141
Dishonour and calumny	125	95
Disappointed ambition	122	410
Grief from love	97	157
Envy and jealousy	94	53
Wounded self-love	53	53
Remorse	49	37
Fanaticism	16	1
Misanthropy	3	3
Cases unknown	1381	377

According to M. FALRET, of 6782 suicides committed between 1797 and 1823, 254 were from disappointed love—157 being in women; 92, from jealousy; 125, from the chagrin caused by calumny; 49, from a desire, without the power, of vindicating character; 122, from disappointed ambition; 322, from reverses of fortune; 16, from wounded vanity; 155, from gambling; 287, from crime and remorse; 728, from domestic distress; 905, from poverty; 16, from fanaticism. Upon comparing this table with the preceding, very great inaccuracy will be apparent, — proving the very little dependence to be placed upon numbers in medical details. Of 500 suicides, committed in Berlin, during six years and a half, Dr. CASPAR states that 14 were caused by offended honour; 61, by insanity; 54, by drunkenness and dissipation; 32, by dread of punishment; 18, by debt and domestic trouble; 12, by love; 11, by matrimonial strife; 3, by disgust of life; 12, by disease and pain; 1, by religious excitement; and 282, by causes which were not specified.

608. *C.* The *modes selected of quitting life* may be briefly noticed. These, in many instances, have some reference to the occupation or profession of the suicide. Thus, military and naval men shoot themselves; chemists and medical men poison themselves, chiefly with prussic acid; barbers and hairdressers cut their throats; shoemakers stab themselves, &c. — Fire-arms and sharp instruments, particularly pistols, razors, knives, and daggers, are most frequently employed by men. Drowning, hanging, poison, and precipitation

---

* I am now attending, for a physical ailment, a boy of 12 years of age, who attempted suicide by hanging, from a feeling of revenge for being punished.

from windows or great heights, are the means of self-murder most commonly resorted to by women. In France, asphyxy, by the vapour of burning charcoal, is often selected by females, and even by males — particularly in cases of associated suicide. Hanging, drowning, and poison are, however, the means most frequently resorted to by both sexes. The choice thus made, does not always depend upon what may be supposed to cause the easiest or the most rapid death; but, probably, upon that mode which offers the greatest facility, or is the most readily carried into effect in moments of irritation, distraction, or depression. It is remarked, that a very large proportion of suicides by drowning, in London, are committed by persons residing in the vicinity of the river, and of the Regent's Canal.

609. Dr. CASPAR states, that of the 525 cases of suicide already noticed, 234 were committed by hanging; 163, by shooting; 60, by drowning; 17, by cutting their throats; 20, by stabbing; 19, by throwing themselves from windows; 10, by poison; 2, by opening an artery. M. ESQUIROL gives the following details of 205 cases of suicide in *females:* — 49, by hanging and strangulation; 45, by precipitation from windows, &c.; 2, by fire-arms; 18, by sharp instruments; 7, by poison*; 5, by asphyxy; 48, by starvation; 31, by drowning.

610. ii. ARRANGEMENT OF THE CAUSES OF SUICIDE. — *A. Circumstances predisposing to this act.*— Hereditary predisposition; the melancholic, bilious, and irritable temperaments; the middle period of life; the male sex; the unmarried state; indulgent and injudicious education, without reference to moral and religious principles; masturbation and sexual excesses; drunkenness; immoral amusements and exhibitions; the perusal of loose productions, and of criminal and suicidal details; idleness and indolence; habitual recourse to powerful mental excitement; infidelity, or a disbelief of a future state of rewards and punishments; states of the air, or of the season or weather, occasioning depression of the nervous energy.

611. *B. Circumstances exciting this act, or occasional exciting causes.* — *a. Direct occasional causes.* —The passions and feelings, — particularly love, conjugal affection, jealousy, ambition, humiliated pride, sentiments of dishonour, loss of female virtue, feelings of shame, violent anger, fear, terror, and remorse; gambling, either from want, or a desire of strong emotion and excitement, or covetousness; imitation, or mental infection; fascination on looking down from precipices; chagrin, desperation or distraction; reverses of fortune; disappointments, domestic unhappiness, and family dissensions; the several forms of moral and partial insanity, especially melancholia and religious insanity; the different states of general insanity, particularly mania and puerperal insanity; and the delirium consequent upon numerous physical maladies.

612. *b. Indirect occasional causes.* — Bodily diseases of various kinds; violent pain, and incurable maladies; the abuse of intoxicating liquors, of opium, of mercury; distaste of life connected with the change of life in females, and the loss of attractions from small-pox, &c.; ennui, or tædium vitæ, consequent upon an effeminate and indolent state of existence, or a state of mind in which the passions are without an object to excite interest, or are incapable of being roused to feel an interest; want and its attendant miseries; anticipated exposure or punishment; motives of revenge.

613. *c. General causes.* — Governments which furnish numerous examples of violent deaths, in the execution of their laws, or which possess a sanguinary penal code; the military spirit, and military governments; republican and democratic constitutions; political commotions, revolutions, and catastrophes — especially at their breaking out, or after the state of excitation and turbulence has passed away; religious fanaticism, and still more the want of religion; superstitious doctrines; unsound religious and philosophical opinions; depraved states of society, of manners, and customs.

614. *C. Causes most influential in this and other free and commercial countries.* — The range given to the social passions; the hazards and losses in mercantile speculations in the funds, and in joint-stock speculations and companies, and the consequent ruin and debasement of families; habits of dissipation, the indolence and ennui consequent upon wealth and sated enjoyment; the importance attached to public opinion, and the instability of that opinion; the violent shocks and collisions of opposing parties; the inactivity to which military and naval persons are reduced during times of peace; the enthusiasm of religious and philosophical sects; the immorality of the literature and scenic representations of the age; and the details of crime and of suicide, which constitute a principal part of the daily reading of all classes of the community.

615. iii. PATHOLOGY.—*A. The lesions observed in suicides upon dissection.* — These, in many cases, will necessarily be the same as have been already described in cases of manifest or fully developed insanity. In many instances, the lesions will have no reference to the production of this act; and, in some, they will be merely the consequences of previous disease, which had nothing to do with the subsequent occurrence of a suicidal impulse. The physical disease may have, in some cases, predisposed to the indulgence of a suicidal intention, by weakening the vital manifestations, and particularly the powers of mind; but, even in such cases, the mental emotion is to be looked upon as the efficient cause of the act. Without, however, attaching much importance to the influence of the structural alterations in producing it, as far as they have been yet investigated, unless when it is unequivocally dependent upon insanity, I shall briefly state those which have been most frequently noticed. HEISTER observed lesions of the liver, gall-bladder, and pancreas. FALRET considers alterations of the liver to be rare; M. ESQUIROL remarked displacement of the colon; OSIANDER, congestion of the vessels of the brain, and chronic inflammation of the intestines; CORVISART, ALBERTI, and OSIANDER, diseases of the heart; GREDING and GALL, thickening and condensation of the cranial bones; HOME, dilatation of the sinuses of the dura mater, and effusion of serum in the ventricles, and between the membranes; RECAMIER and others, thickening of

---

* The small number of suicides by poison, in the tables furnished by CASPAR and ESQUIROL, deserves remark. On the Continent, it is very difficult to procure poisonous substances unless by means of a physician's prescription. In this country, a child or any wretch may procure them for purposes of murder or suicide, without any difficulty and at the lowest prices, at all the shops with very few exceptions where drugs and medicines are vended.

the arachnoid and dura mater, with ossific depositions in the latter; FALRET and FOVILLE, traces of vascular irritation and excitement in the membranes and substance of the brain; and FRANK and ESQUIROL have failed, in many instances, to detect any appreciable lesion of any organ. From 1333 inspections of suicides, the following results have been given, but with little appearance of precision or accuracy: — Thickening of the cranial bones in 150; bony excrescences from their inner surface in 50; disease of the membranes of the brain in 170; inflammatory appearances of the brain in 90; simple congestion of the brain in 300; tumours in the brain in 10; softening of the brain in 100; disease of the lungs in 100; lesions of the heart in 10; disease of the stomach in 100; alterations of the liver in 80; lesions of the intestines in 50; suppression of the natural secretions in 15; syphilitic disease in 8; and no apparent structural change in 100. (See § 223. *et seq.*)

616. *B. Physiological Pathology.* — Suicide may be viewed, in many cases, even when proceeding from passion and feeling, as the result of deranged action of the vessels of the encephalon and of its membranes, consequent upon altered sensation or excited emotion; but it cannot be considered as essentially and exclusively depending upon this pathological cause. The intellectual and moral phenomena, which either directly or indirectly give rise to the suicidal determination, cannot be shown to be always the consequence of vascular lesion, or even of excited vascular action; although they often lead to such lesion, from the intimate connection existing between the mental manifestations and the organic actions. The numerous instances in which suicide is attempted, from ebullitions of temper or gusts of passion or feeling, and in which the means of self-destruction fail of accomplishing the intended end, leaving those who made the attempt calm, resigned, and happy at having failed in their intentions, fully prove the absence of established vascular lesion; and show the remarkable difference between these and cases depending upon real and confirmed insanity, which we never find so immediately and permanently cured, as those instances of attempted suicide fortunately are, and cured by the same means as so generally fail in every form of suicide proceeding from manifest insanity, wherein, it may be presumed, that lesion of vascular action in the encephalon, as well as of organic nervous power, actually exists. We are therefore obliged to conclude, that mental power may be, *hereditarily* or *originally*, or from the influence of the *predisposing causes* of suicide, so weak, or so morbidly impressible or susceptible, as to give way to the impulses to this act, arising out of any of its exciting causes, either before the controlling powers of mind have had time to re-act and to resist the suicidal impulse, or from the circumstance of those powers having been so weakened as to be incapable of sufficiently resisting this impulse when excited by powerful or by combined causes. In these cases, this act is to be imputed to the state of mental energy — to a constitution of the mind arising out of hereditary conformation, and the prolonged operation of predisposing circumstances, rather than to any appreciable disorder of the cerebral circulation.

617. On the other hand, it ought to be admitted, that incessant application to study, to business, to political events, to the views and interests of parties and sects, to the discharge of public duties, or to the support of public measures, as well as many of the numerous causes above specified, will so far overturn the equilibrium of the circulation, as to occasion an erethism of the vessels of the brain and its membranes, verging upon inflammation, if not actually amounting to it. Such a condition of this organ may betray itself by a slight delirium, or partial or slight form of mental alienation, by general irritation or nervousness, or by slight fever, or by burning headach, with little other disturbance of the system; or it may evince itself by a peculiarity of manner, by the unusual direction of ideas, or by the state of temper and feelings. If, during this condition of disorder, the ideas should be led to self-destruction, or if any circumstance, whether domestic or public, should occur, which, by exciting the temper or affections, may suddenly increase the cerebral disorder, as well as the consequent morbid ideas or resolution, suicide may be attempted: or if, either after or before the ideas prompting to this act have suggested themselves, the individual should be placed in a state of comparative inactivity, and his ideas be allowed to flow in a direction most likely to suggest or to confirm the resolution to resort to self-murder, the event, although more maturely contemplated, may not be the less certainly accomplished.

618. Suicide, viewed in this direction — the only one in which it can be considered with propriety as a physical disease, — may be attempted by the strongest and most accomplished minds; although much less frequently than by others educated without just principles, and undisciplined in the school of difficulty, disappointment, and misfortune. It is, under these circumstances, like other mental alienations, the result of vascular disorder in an organ intimately connected with the intellectual and moral manifestations. We cannot, therefore, be surprised that persons, subjected to the most important and harassing duties, and undertakings, and anxieties, should suffer in that organ which is the medium or instrument of these distracting operations; and that the consequences resulting from them, both to the organ itself, and to the faculties related to it, should be exactly those, which these causes are most likely, both from theory and experience, to produce.

619. *C. Is there a Suicidal Monomania?*—M. ANDRAL remarks, that "man is sometimes possessed by a sentiment which tends to self-destruction. This feeling is designated '*Suicidal Monomania.*' It is not always the result of mental alienation: some persons put an end to their existence, who are not monomaniacs," &c. Now, this is a contradiction both in terms and meaning, not very consistent with the reputation which this writer has obtained in this country. After what has already been stated, it will be evident that suicide is either the result of some form or other of general or partial insanity; or of some state of excessive passion or feeling, which does not, in the usual acceptation of the term, amount to insanity, — although such passion or feeling may, at the moment, as completely overpower reason and self-control, as any form of monomania. If moral insanity, which I have described above, as constituting a form of partial insanity, be further ex-

tended than I have ventured upon, — and, instead of being confined to those moral states of aberration, which either are slowly developed, or are pertinaciously entertained, or both, be made to comprise those momentary states of excessive passion or feeling, which are suddenly excited by intense moral causes, and which, in well regulated minds, soon subside, without any very appreciable impairment of reason and self-control, but which, in impressible minds unaccustomed to control, to disappointments, to losses, and distraction, often give occasion to insanity or suicide, — then those cases of this act, that thus originate, and that seem the least of all dependent upon insanity, may be considered as actually the result of the insane state; and to these, the term suicidal monomania, or any other equally expressive of the insane condition, may be applied. But, if we thus extend the meaning of moral insanity, we must stretch it still further, and make it comprise also every act of passion or anger, — even the act of just indignation roused by insult; especially when insult is repelled by a retributive blow which may endanger the life of the aggressor. It may be granted that, in a few cases, suicide is the first symptom of insanity; the patient having been previously undisordered in mind. But this is an assumption rarely admitting of proof, unless where the act has been attempted only, and not carried into effect, — other insane acts being afterwards committed. M. ANDRAL, as just noticed, admits that persons destroy themselves as the result of other circumstances than the want of reason; and yet he terms suicide thus occasioned, a form of partial insanity, and designates it "suicidal monomania." Self-murder may depend upon many grades of insanity, and may, as I have shown, be the consequence of the several forms of moral insanity; but, when no degree of this malady is manifest beyond this act, it would be more correct to view it as the consequence of intense passion or feeling, — the impulse to self-destruction arising out of these emotions overpowering, for the moment, the dictates of reason, and the control of the judgment. According to this view, the term here used may still be said to be appropriate; and it may be allowed to be so, if the word insanity be extended to the utmost, so as to comprise the momentary impulses of passion, feeling, and mental depression. Suicide committed, or even attempted, in such circumstances, may then be viewed as a proof of insanity, or be considered as a form of moral insanity, or, as M. ANDRAL has done, with various contradictions of himself, as a monomania, — the aberration of mind consisting only of the impulse to self-destruction. If, on the other hand, *insanity* is to be viewed in a less comprehensive sense, — if it is *not* to be extended to those momentary impulses of excited or depressed passion and feeling, which lead to acts of violence against others or ourselves, and which only for a time overpower reason and judgment, — then suicide committed or attempted in the circumstances referred to, cannot be justly viewed in the above light; but should be looked upon as an act of passion, that, like other violent acts, cannot, consistently with good morals, or even with the safety of society, be treated as an insane act. In the forms of moral insanity noticed above (§ 69. *et seq.*), it has been shown that, in addition to its more or less gradual developement, the moral aberration is generally pertinaciously adhered to; and that, when suicide follows, the connection of this act with such aberration, and with impairment of the mental powers, is very obvious: but, where disorder of the moral manifestations, or of the judgment, is not apparent, suicide being attempted, from a desire to escape the punishment of crime, or from humiliations of any kind, or from intense passion, distraction, or depression suddenly excited — from some moral shock, the dependence of this act upon a state of mind actually insane is not so manifest; and it will be to the benefit of the community not to consider it, in such circumstances, as the result of insanity. Numerous instances have been recorded, of persons who have had recourse to suicide from imitation or fascination — from the mental infection, caused by the self-murder of some one, however little noted for station, or character. In such cases, a predisposition to this crime may have already existed, or circumstances may have occurred to favour the suggestion of ideas of self-destruction; the suicidal disposition being confirmed, or determined, by perusing the details of this act generally so lavishly furnished by the daily and weekly prints. In some of those occasions of imitative or epidemic suicide, the moral infection has been arrested by inflicting unusual indignities on the bodies of those who perpetrated the crime; thereby showing that this act was not, as respected many of the cases which occurred in these circumstances, altogether the result of the absence of reason, or that the persons who had committed it could not be accounted irresponsible agents.

620. iv. PROGNOSIS. — The suicidal determination is generally removed with difficulty; and more especially when it is consequent upon any of the forms of moral and partial insanity, or is connected with chronic mania. In the advanced stages of melancholia particularly, as well as in several other states of both partial and general alienation of mind, the determination to commit suicide may be concealed, frequently in so artful a manner as to lull the suspicions of the most careful attendants; but it is never removed, unless the mental disorder, of which it is the associate, be altogether cured; and even in this latter case, the incipient return of insanity, or even the occurrence of some of the symptoms usually preceding its return, may be attended by the suicidal attempt. When suicide, however, is the consequence of violent passion and feeling, — of some shock which the mind is incapable of enduring at the time, — when it proceeds from temporary causes, and more especially where the attempt has been made when the mind has been subjected to the first impression of the *direct occasional causes* (§ 611.), and when the *predisposing causes* are not powerful, nor retain their influence in the mind, — then well grounded hopes of the removal of an inclination to suicide may be entertained. When this act has been attempted from causes favouring an unusual determination of blood to the head, or erethysm of the capillary circulation of the brain, — as violent mental excitement, controversy, distraction, or intense mental exertion, the violent shocks of revolution, or the collision of opposing parties, &c., — then an appropriate physical treatment — especially that directed to the removal of increased action in the brain, and of interrupted secretion and excretion — will generally

also remove every disposition to a repetition of the attempt; unless, indeed, similar exciting causes again come in operation. In all cases of attempted suicide from powerful passion or feelings, the possibility of some form of insanity, particularly melancholia and mania, being soon afterwards developed, should be anticipated — and the more especially, if mental disorder, or a suicidal propensity, has appeared in any of the members of the patient's family. In families thus circumstanced, the suicidal attempt is sometimes the first manifestation of insanity.

621. v. TREATMENT.—The treatment of a suicidal disposition, in most cases, and especially in those which are connected with the more obvious manifestations of partial or general insanity, is to be conducted on nearly the same principles as have been explained with reference to these states of disease. In such cases, the suicidal determination is only a part of the disorder, requiring the increased care of the attendants, and greater caution on the part of the medical advisers, particularly during apparent convalescence and recovery; and the strictest precautions against a return of the malady, and upon the appearance of symptoms usually preceding this occurrence; but in other respects demanding little or no modification of the physical and moral means of cure, already advised for the several forms of mental disease. The few observations, therefore, which it will be necessary to offer on the treatment of the suicidal impulse or disposition, may be divided into those which refer — 1st, to the careful removal of the circumstances which suggested or occasioned it; — 2dly, to the physical means which should be resorted to; — and, 3dly, to the preservative measures, or means of repression, moral and legislative, which may be instituted.

622. *A.* The *avoidance or removal of the circumstances or causes*, which suggested or occasioned the suicidal attempt, is the basis on which both physical and moral means of cure must necessarily be placed. This end, however, cannot always, or even generally, be attained; particularly where certain events have produced a powerful or morbid impression on the patient's mind; or where the attempt has proceeded from an insane delusion. Under the former circumstances, we can only endeavour to counteract, or to weaken, the emotion produced: in the latter case, the delusion will disappear only upon the removal of the mental disease. A knowledge of the several occasions of the suicidal determination will sometimes enable the physician to recommend means to neutralise their injurious influence, even when he finds that the patient is incapable of escaping from their baneful influence on his mind.

623. *B.* The *physical means of cure* should be directed chiefly with reference to the symptoms indicating the condition of the circulation in the brain, and the state of organic nervous power. These symptoms should be carefully investigated, and considered in connection with the phenomena more intimately connected with the suicidal impulse, and with mental disorder. If the impulse has followed any of the states of moral insanity, or melancholia, or other forms of alienation, the treatment, physical and moral, is altogether the same as already described; stricter precautions during the treatment, and upon the restoration of the patient to society, being requisite. In many of these cases, particularly those depending upon melancholia, and where the suicidal determination has appeared in consequence of the circumstances which have been shown generally to occasion increased action of the cerebral vessels, and of violent passion, chagrin, or distraction, general or local *vascular depletion*, *purgatives*, *refrigerants*, and *derivatives* are requisite. The pain, tension, or constriction, and uneasiness so frequently experienced in the head; the disordered action of the carotids and cerebral vessels, and the appearance of the eyes; the temperature of the scalp; and the changes frequently observed after death, — all evince the propriety of repeated bloodlettings, especially in the immediate vicinity of the brain, or of the hæmorrhoidal vessels. Cold affusions on the head, cold applications, the shower bath; purgatives conjoined with sedatives and repressants; refrigerants with diaphoretics; occasionally powerful or deobstruent cathartics, and sometimes emetics; anodynes with antispasmodics; dry cupping, setons, blisters, or other derivative applications on the nape of the neck, or on the hypochondria; and, after depletions and deobstruent evacuants, restoratives and tonics, — constitute, in such cases, the chief physical means of cure; but they require to be varied appropriately to the peculiarities of individual cases, and to be aided by hygeienic and moral measures, according to the circumstances or motives occasioning the suicidal attempt, and the form of insanity of which it may have been a manifestation. In most instances, however, exercise in the open air, manual and mental occupations, travelling, active amusements, hunting and horseback exercise, visiting watering places, &c., living in a dry and equable atmosphere, change of air and of scene, and the moral influences (§ 500. *et seq.*) already fully described, should be brought in aid of the more strictly medical agents.

624. After vascular depletions, where they are indicated, *emetics*, even a repetition of them, are often of great service, where the suicidal propensity has recently appeared; and, if much biliary disorder is present, a dose of *calomel*, followed by *stomachic purgatives*, and subsequently by *restoratives* and *antispasmodics*, as the preparations of valerian, will often be useful. *Warm bathing*, and cold sponging the head during the bath, or the *cold affusion* on the head; and the *shower bath* every morning, the feet being immersed in warm water; are also important, and generally appropriate remedies. The suicidal determination is very frequently associated with, and sometimes the consequence of, prolonged sleeplessness, arising from the remote causes of the mental affection. In these cases, a recourse to *narcotics* becomes requisite; the selection and combination of them, as well as the particular indications connected with the use of them, being guided by the principles already explained (§ 475. *et seq.*)

625. *C. Surveillance and restraint.*—Whenever a suicidal propensity appears, the disease should be treated, as respects *seclusion* and *control*, in every respect as above recommended (§ 388. *et seq.*); and the patient be placed in the charge of an experienced and vigilant attendant. Care should be taken to remove from his person and apartment, every article, by means of which he may carry his design into execution; and the windows, doors, &c. should be secured. Even

the bed-clothes should be carefully examined, lest portions of them should be torn off, for the purpose of self-strangulation. Although melancholic and other insane persons are not so likely to attempt suicide when others are present, as when alone; yet, the former circumstance is not always sufficient to deter them from it. Dr. Burrows adduces an instance, in which a medical man, whilst another person was present, attempted to open the femoral artery with a penknife. His father and grandfather had both destroyed themselves. He had never met with any circumstance to occasion him particular disquietude; but, at the age of forty-five, he became dyspeptic, low-spirited, and listless. He expressed extreme sorrow for the attempt on his life; yet, in three or four days, he seized a razor from the dressing table, whilst his keeper's back was turned, and at one stroke divided one of the carotid arteries.

626. A person who has once entertained a suicidal propensity, should not be confided in, however strongly he may express his regrets at having made an attempt to carry it into effect, as long as the feelings continue, either more than usually blunted, or morbidly sensitive, — whilst the bearing of the patient continues embarrassed or perturbated, or his ideas confused, unsettled, or disturbed. If he complain of heats and flushings in various parts of his body, or partial sweats; and especially if his nights are sleepless; if he cannot look the person whom he addresses fully in the face with a firm expression; and if his eyes betray timidity, fearfulness, distrust, and restlessness; — other attempts will be made. Although the patient may have recovered his serenity of mind, a return of these indications ought to call for the most watchful solicitude from the medical and other attendants; for, although the patient may not seem to entertain any ideas of suicide, or may actually not feel any inclination to commit the act, yet the occurrence of an opportunity, or the accidental sight of an instrument of self-destruction, may give rise to the impulse, which may instantly be carried into fatal effect.

627. Whenever a great calamity has overtaken a person of weak resolution, of the melancholic, nervous, or irritable temperament, and especially if insanity or suicide have occurred in any branch of his family, — particularly if the affliction is sudden or recent, and productive of great mental distress, or of singularity of conduct or conversation,—the probability of his attempting suicide ought not to be overlooked. The design, however, in these circumstances, may be concealed from superficial observers; but the physician will detect, in the expression of the eyes and looks, in the suppressed struggle to conceal his emotions, in the constrained respiration, and the accelerated, excited, or irregular pulse, sufficient causes to require the utmost vigilance on the parts of both friends and attendants. In such cases, the previous character and fortitude of the patient may lull every fear; but the greatest talents, and the strongest minds, have yielded to intense emotion. The moral character and disposition of the patient may have been changed, before the suicidal propensity was developed; many of the circumstances, to which this propensity had been directly imputed, actually occasioning a state of moral or partial insanity, of which the suicidal intention was only an attendant or consequence. Moreover, character and disposition only should not afford any grounds of confidence in persons subjected to the more intense emotions, or to the more energetic occasions of this act; more especially if they have not formerly experienced events requiring the exertion of mental energy and fortitude. Many men, eminent for talent and excellence of disposition, have committed suicide, when overtaken by adversity. Several instances of this kind occurred, during an early part of the present century, in this country; and have been adduced by some writers, as proofs of the strongest minds being liable to give way to the suicidal impulse. But eminence and talent are distinct from fortitude in adversity; and even from that constitution of mind, to which the terms strength of mind or force of character have been applied. It is doubtful how far these persons were really possessed of these latter characteristics; inasmuch as they are usually acquired, in combating difficulties, in patiently bearing adversity and disappointments, and in controlling the more poignant emotions which difficulty and adversity call forth. In this school, where true force of character and fortitude are chiefly, if not only, to be acquired, these persons may not have been sufficiently disciplined; for, when the course of prosperity has been uninterrupted and rapid, however eminent the abilities which have contributed to it may have been, sudden adversity may endanger the perfect sanity or fortitude of a mind, unaccustomed to sustain, and unprepared to meet, its shock.

628. There is no part of a physician's duty which is so difficult, as Dr. Burrows has remarked, as to decide upon the exact time when he may place confidence in a convalescent suicide. If this confidence be yielded prematurely, the act, which time and great care had been employed to avert, may be immediately perpetrated; whilst, if it be withheld when the patient feels that he has been labouring under a delusion, the effect may be such as to endanger a return of his delusion, or of the suicidal propensity.

629. When the suicidal determination cannot be carried into effect by any other means, owing to the care of the attendants, the patient sometimes determines to starve himself. Management may do much in overcoming this intention. Kind entreaties and stratagems may be resorted to; and tempting articles may be set before him, or left within his reach, without any further notice. If he partake of it, no remark should be made, but the same course pursued. If these means fail, the stomach-pump ought to be resorted to.

630. M. Falret observes, that noisy or immoderate gaiety irritates melancholic suicides, or, at best, affords only a transient pleasure, followed by increased misery. He states, that he has accompanied these persons to the theatre, and to the hospitals, in order to compare the effects produced upon them by these opposite spectacles; and he has found, that visits to the really afflicted were most useful, by suggesting the idea, that others had still greater cause than they of being unhappy.

631. *D.* Prevention and Repression. — The increasing frequency of suicide, as well as of manifest insanity, requires some notice of the means by which it may be, in some measure, repressed, although no sanguine hopes of success from them can rationally be entertained in the present states

of society. As long as education, manners, morals, and social intercourse continue as they now are — as long as crimes, murders, and suicides are seductively detailed and daily furnished to the public, through a thousand channels, for the purposes of private gain — as long as the perpetrators of crimes and of homicides are held out, both on the stage and from the press, as heroes of their day — as long as the overthrow of moral and religious principles, and the infection or contamination of the public mind, are made objects of gainful speculation, into which persons in place or authority are not considered dishonoured by entering — as long as the streams of moral pollution are allowed to flow without either strenuous, or well-directed, or combined efforts to confine or to counteract them — as long as the most instant and efficient agents of self-destruction are openly sold in every street, at little or no price, and to any purchaser, without either "let or hindrance" — as long as the struggles of great parties in politics and religion absorb, in connection with the details of every vice and every crime, the public mind, each party endeavouring to depress and ruin the others, without regard to the general weal — as long as provision for the pecuniary wants of the state, and the power and patronage of office, constitute the chief objects of governments — as long as justice is within the reach only of the wealthy, as laws protect chiefly the bad, as the weak are unshielded, and the deserving unrewarded — as long as

> —— "The whips and scorns of time,
> The oppressor's wrong, the proud man's contumely,
> The pangs of despised love, the law's delay,
> The insolence of office, and the spurns
> That patient merit of the unworthy takes,"

shall continue to "puzzle the will" — as long as the lives of all classes are endangered, and their minds distracted, by unprincipled and ignorant pretenders to medical and religious knowledge, who are allowed, and even encouraged, to take advantage of the credulity and fears of the weak-minded — as long, in short, as moral degradation and physical destitution exist, and as long as the safety of the people is *not* the supreme law of the state — as long as these several conditions of a country continue, and in proportion to their separate and combined influence — so long will suicides be frequent or even increase.

632. The history of all nations has demonstrated the prevalence of this act, both as a disease and as a psychological phenomenon, during periods of surpassing luxury, of criminal debasement, of public commotion*, and of the decline of public and private spirit and virtue. In such circumstances, laws directed simply to this act, and without reference to the sources of the evil — to the various contaminating moral agents, poisoning the minds of the community — will be of but little avail. It is obvious, that laws which, as at present, affect only the property of the suicide, are unjust, as they cannot punish the guilty, but fall exclusively on the innocent — on those already punished by the act of the suicide. The only means of *prevention* which have been found to succeed, on occasions of epidemic or imitative suicides, have been such as tended to impress the ignorant with the moral and religious turpitude of the act, to influence public opinion in its reprobation, and to convince the perpetrator of the crime, that, although he escapes from feeling the punishment it merits, every indignity, which is compatible with the good of society, will, as a consequence, be offered to his body, and to his memory. Each member of the community lives not for himself alone, but for the common weal, and in order to contribute to the general, the mutual, the public, and the private support, requisite to the healthful constitution of society. As it is the chief purpose of good government to preserve inviolate this principle of existence in all associated communities, so ought every effort to contravene it, or to escape from the responsibilities it involves, to be repressed and punished in ways the most effectual, conformably with the spirit in which only should punishment be inflicted; and even those, who either directly or indirectly aid in the commission of this act, should be subjected to punishment. The difficulty, however, is to determine upon measures which may have any influence in diminishing the number of suicides, who are either irresponsible agents, or are in that state of mind which is uninfluenced by worldly considerations. There is every reason to believe, nevertheless, that many of those who commit this act without being manifestly insane — who entertain a suicidal propensity from depression of spirits; from mortified pride; from domestic chagrin or irritation; from excessive passion or feeling; from imitation, fascination, or mental infection; from extreme profligacy, debauchery, and satiety, &c., — would be deterred from it by the conviction that, if they perpetrated this crime, some indignity to their bodies, and disgrace to their memories, would be the result. If it were enacted that the body of a suicide, who had not evinced sufficient proof of previous insanity to require restraint, or whose relations had not seen sufficient proof of mental disorder to obtain medical aid, or other assistance requisite to the protection of others as well as of himself, should be made subservient to medical instruction, and consequently to the general weal, — I am confident that the number of suicides would diminish, notwithstanding the increased, and increasing, sources of mental contamination, and of mental disease. Means of repression directed to the property of a suicide would have little avail, and would, moreover, punish the innocent, without affecting the guilty; but such means ought to be strenuously directed against those who deal in poisonous substances, and ought to be rendered so stringent as entirely to prevent such substances from being procured unless by means of a physician's or surgeon's order or prescription. It is well known, that suicide is often committed in moments of irritation or passion, and that as soon as the feeling subsides — in the course even of a few minutes — the suicidal impulse or intention may cease to influence volition so powerfully as to lead to the commission of the act. Therefore, if difficulties were thrown in the way of resorting to it, during periods of irritation and suicidal impulse, it might not afterwards be entertained, or the sober mind would recoil with so great horror

---

* In the summer of 1793, upwards of 1300 suicides were committed in Versailles and its vicinity! During "the reign of terror," or rather of crime, suicides were committed by the guilty, by the terrified, by infidels, and contemners of moral and religious principles, by public and private criminals, and by those distracted by losses of fortune and friends, in unheard of numbers, throughout France.

from the morbid idea, as to view it with increased dislike, or would endeavour otherwise to fortify or to protect itself against a return of the propensity.

633. Having thrown out these hints as to the only means of repression which can be suggested, after a consideration of those which have been enacted in this and in foreign countries, I would merely add, that the growing frequency of suicide requires that means, direct and indirect, should be taken by the legislature to restrain it. As, however, many of the most influential causes of suicide can only be indirectly affected by legislative measures, and as some of these causes belong to the liberty enjoyed by all classes, although appertaining chiefly to the most worthless parts of that liberty, but little hope can reasonably be entertained that the frequency of this act will be much diminished, — as long, at least, as the circumstances arising out of the education, morals, amusements, and social relations of the community, to which it is in great measure referrible, continue unchanged.

Bibliog. and Refer. — *Celsus*, Lib. iii. c. 18.—*Plinius*, Lib. xxviii. c. 17. — *Aretæus*, Cur. Chron. lib. i. c. 5. — *Paulus Æginetus*, Lib. iii. c. 14. — *Oribasius*, Synopsis, Lib. viii. c. 7, 8.—*A. Constantinus*, De Melancholia, lib. ii., in Opera, fol. Basil, 1536. — *T. Stocker*, The Worlde possessed with Devils; from the French. 8vo. Lond. 1583.— *Primerosius*, De Morb. Mulieb. lib. iii. c. 8.—*Willis*, De Anima Brutorum, c. 11, 12. — *Zacutus Lusitanus*, Med. Pr. Hist. lib. i. No. 33.; et Prax. Admirab. lib. i. 46, 47. — *T. Bright*, A Treat. of Melancholie, with the Causes and Cure thereof. 12mo. Lond. 1586. — *A. Laurentius*, Discours des Mal. Mélancholiques. 12mo. Paris, 1597. — *H. Saxonia*, Tract. de Melanchol. fol. Venet. 1610. — *J. Ferraud*, Traité de la Maladie d'Amour, ou de la Mélancholie Erotique. 8vo. Paris, 1623.—*R. Burton*, The Anat. of Melanchol., &c. fol. Oxon. 1624. —*A. Ponce*, Dignotio et Cura Affect. Melanchol. 4to. Madr. 1624.—*H. Hering*, Microcosmus Melancholicus. 12mo. Brem. 1638. — *A. Probst*, De Phantasia ejusque per Melancholiam Adfectione. 12mo. Berl. 1654. — *J. W. Faust*, Ordo et Methodus cognoscendi et curandi Maniam. 4to. Jenæ, 1666. — *G. Harvey*, Morbus Anglicus, or the Anatòmy of Consumpt., with Discourses on Melancholy and Madness caused by Love. 8vo. Lond. 1666. — *E. Childmead*, *Ερωτομανια*, or a Treat. on Erotic Melancholie; from the French. 8vo. Oxon. 1672. — *F. Freytag*, Bericht von der Mel. Hypochondriaca. 12mo. Augsb. 1678. —*T. Mayerne*, Prax. Med. p. 67. — *Bonet*, Sepulchret. lib. i. sec. ix. obs. 5. 8. 10. 13. 35. 38.—*H. M. Herwig*, The Art of curing Sympathetically or Magnetically, with a Discourse on the Cure of Madness. 8vo. Lond. 1700. — *T. Fallowes*, Method of curing Lunatics. 8vo. Lond. 1705. — *Hoffmann*, De Delirio Melancholico, obs. 2, 3.; et Opera, vol. iii. p. 264. —*Mead*, Medica Sacra, c. 3—7. — *R. Blakeway*, An Essay towards the Cure of Religious Melancholy. 8vo. Lond. 1717. — *C. Parry*, Essay on the Nature and Causes of Madness. 8vo. Rotterd. 1723. — *Colombier*, Instruct. sur la Manière de gouverner les Insensés, &c. 8vo. Paris, 1736. — *P. Frings*, A Treatise on Frenzy. 8vo. Lond. 1746. — *Morgagni*, De Sed. et Caus. Morb. epist. viii. art. 2., et 5. ad 16. — *L. A. Klockoff*, De Morbis Animi ab Infirmato Tenore Medullæ Cerebri. 8vo. Traj. ad Rhen. 1753. — *P. Billings*, Folly predominant, with a Dissert. on the Impossibility of curing Lunatics in Bedlam. 8vo. Lond. 1755. — *A. Arrigoni*, Della Mania, della Frenesia, e della Rabbia. 4to. Verona, 1757. — *W. Battie*, A Treat. on Madness. 4to. Lond. 1757. — *J. Monro*, Remarks on Dr. Battie's Treat. on Madness. 8vo. Lond. 1757. — *J. F. Kübel*, Die Mittel, wie den Hypochond. Melanchol. und Maniacis zu Helfen. 8vo. Bresl. 1758. — *Wherlhoff*, Opera, t. iii. p. 693.—*Selig*, Observs. No. 4, 5. 10, 11.—*E. Nicolai*, Gedanken von der Verwirrung des Vestandes, &c. 8vo. Kopenh. 1758. — *A. C. Lorry*, De Melancholia et Morb. Melanch. 2 vols. 8vo. Paris, 1765. — *Meckel*, in Mém. de l'Acad. de Berlin, Ann. 1764, p. 65. — *Bona*, Obs. Med. Patav. 1766. — *Locher*, Obs. Pract. p. 65. — *Burserius*, Institut. t. iii. p. 195. — *L. Avenbrugger*, Experim. nascens de Remedio specifico sub Signo specifico in Mania Virorum. 8vo. Wien. 1776. — *W. Perfect*, Methods of Cure in some particular Cases of Insanity. 8vo. Rochest. 1778. — An Address to the Public on Insanity. 4to. Lond. 1784. — Select Cases of Insanity. 8vo. Rochest. 1787. — Annals of Insanity. 8vo. Lond. 1801. — *Bang*, in Acta Reg. Soc. Med. Haun. t. i. p. 95., t. ii. p. 52. — *B. Fawcet*, Observ. on the Causes and Cure of Melanch., especially Religious Melancholy. 8vo. Shrewsbury, 1780. — *C. L. F. Andry*, Recherches sur la Mélancholie. 4to. Paris, 1786. — *T. Arnold*, Observat. on the Nature, &c. of Insanity. 2 vols. Leicest. 1782—6.—*Greding*, in *Ludwig*, Adversaria, pt. i. p. 2. — *Murray*, Appar. Med. vol. i. p. 713. — *A. Harper*, A Treatise on the Real Cause and Cure of Insanity. 8vo. Lond. 1789. — *Ludwig*, De Belladonna ejusque Usu in Vesania. Jenæ, 1789.; in *Doering's* Tract. t. i. p. 277. — *B. Faulkner*, Observ. on the general and improper Treatm. of Insanity. 8vo. Lond. 1790. — *J. Daquin*, La Philosophie de la Folie. 8vo. Paris, 1792. — *W. Pargeter*, Observ. on Maniacal Disorders. 8vo. Read. 1792. — *W. Belcher*, Address to Humanity; a Receipt to make a Lunatic, &c. 8vo. Lond. 1796. — *J. G. Langermann*, De Methodo cognoscendi curandique Animi Morbos. 8vo. Jenæ, 1797. — *Ferriar*, Med. Hist. vol. ii. art. 2. — *Ackermann*, Medicinische Skizzen. b. ii. No. 4. — *Autenrieth*, Versuche für die Pract. Heilk. b. i. p. 199.—*J. J. Schmidt*, Ueber Psychologische behandlung der Krankh. des Organs der Seele. 8vo. Hamb. 1797. — *A. Crichton*, An Inquiry into the Nature and Origin of Mental Derangement, &c. 2 vols. 8vo. Lond. 1798.—*Dorfmüller*, in *Stark's* N. Archiv für die Geburtshülfe. 8vo. b. iii. p. 58. (*Puerperal Ins.*) — *Oberteuffer*, in Ibid. b. ii. p. 681. — *Sims*, in Mem. of Med. Soc. of Lond. vol. v. art. 37. — *Percival*, in Ibid. vol. ii. p. 288. — *Parry*, in Ibid. vol. iii. art. 8. — *Currie*, in Ibid. vol. vi. art. 2. — *J. C. Hoffbauer*, Untersuchungen ueber die Krankheiten der Seele, &c. 8vo. Hal. 1803. — *T. Pinel*, Traité sur l'Aliénation Mentale. 8vo. Paris, 1801. Translated by *D. D. Davis*. 8vo. Sheffield, 1806.; et in Mém. de la Soc. Méd. d'Emulation. Ann. iii. pt. i. — *G. Blane*, in Trans. of Soc. for Improvement of Med. Knowledge, vol. ii. p. 192. — *Bichat*, Anat. Génér. t. i. p. 225. — *Hufeland*, in Journ. der Pract. Heilk. b. ix. st. 3. p. 101. — *Remer*, in Ibid. b. xvii. st. 2. p. 127. — *Tolberg*, in Ibid. b. xxvi. st. 3. p. 32. — *Wendelstadt*, Ibid. b. xxvii. st. 1. — *A. Meyer*, in Ibid. b. xix. st. 2. — *Barton*, Mat. Medica. Philadelphia, 1802. — *J. M. Cox*, Practical Observations on Insanity. 8vo. Lond. 1804. — *J. Haslam*, Observat. on Insanity. 8vo. Lond. 1798. — *W. Rowley*, Treatise on Madness and Suicide. 8vo. Lond. 1804. — *E. Esquirol*, Des Passions considérées comme Causes, Symptomes, et Moyens curatives de l'Aliénation Mentale. 4to. Paris, 1805; in Journ. Génér. de Médécine, t. xxv. p. 228. — *P. A. Prost*, Coup d'Œil Physiolog. sur la Folie. 8vo. Paris, 1806. — *A. Winkelmann*, Beobachtungen über den Wahnsinn. 8vo. 1806. — *B. Crowther*, Practical Remarks on Insanity. 8vo. Lond. 1807. — *J. Frank*, Acta Institut. Clin. Viln. t. i. p. 77., t. iii. p. 53. — *V. Chiaruggi*, Della Pazzia in Genere ed in Especie. 8vo. Firenze, 1808. —*T. Arnold*, Observ. on the Management of the Insane. 8vo. Lond. 1809. — *J. Haslam*, Observ. on Madness and Melancholy. 8vo. Lond. 1809. — Illustrations of Madness. 8vo. Lond. 1810. — Considerations on the Moral Management of Insane Persons. 8vo. Lond. 1817. — *W. Black*, Dissert. on Insanity. 8vo. Lond. 1810. — *W. S. Hallaran*, Enquiry into the Causes producing the extraordinary Addition to the Number of the Insane, &c. 8vo. Cork, 1810. — *W. Stark*, Remarks on Hospitals for the Cure of Ment. Derangement. 8vo. Glasg. 1810. — *J. Parkinson*, Observ. on the Act for Regulating Mad-Houses. 8vo. Lond. 1811. — *A. Haindorf*, Versuch einer Pathol. der Geisteskrankheiten. 8vo. Carlsr. 1811. — *Selig*, in Annalen der Heilkunst, May, 1811, p. 427. — *Loebel*, in *Horn*, Archiv, May, 1810, p. 77., et Jan. 1812, p. 102., May, 1812, p. 571. — *Neumann*, in Ibid. May, 1811, p. 482. — *Brückmann*, in Ibid. Jan. 1811, p. 3. (*Puerperal.*) — *Loebenstein*, in *Horn*, Archiv, Jan. 1812, p. 97. — *Fonzago*, Sulle Virtù della Digitale. Padua, 1810. — *Pinel*, in Mém. de la Soc. Méd. d'Emul. t. iv. p. 391. (*Periodic.*) — *Vogel*, in *Hufeland* und *Himly*, Journ. der Pract. Heilk. Jan. 1812, p. 97. — *S. Tuke*, Descript. of the Retreat near York. 8vo. York, 1813. — *Percival*, in Dublin Hospital Reports, vol. i. p. 117. — *G. N. Hill*, An Essay on the Prevention and Cure of Insanity. 8vo. Lond. 1814. — *T. Forster*, Sketch of the New Anatomy of the Brain, and its Relations to Insanity, &c. 8vo. Lond. 1815. — *A. Marshall*, The Morb. Anatomy of the Brain in Mania. 8vo. Lond. 1815. — *J. R. J. Dubuisson*, Des Vésaines ou Maladies Mentales. 8vo. Paris, 1816. — *J. Reid*, Essays on Insanity, &c. 8vo. Lond. 1816. — *Gumbrecht*, in Lond. Med. Repos. vol. iii. p. 328. —*A. Matthey*, Nouvelles Recherches sur les Mal. de l'Esprit. 8vo. Paris, 1816. — *T. Foster*, Observ. on the Influence of the Atmosphere on Insanity, &c. 8vo. Lond. 1817.; and Observ. on the Phenomena of Insanity, &c. 8vo. Lond. 1817. — *T. Mayo*, Remarks on Insanity, founded on the Practice of *Dr. J. Mayo*. 8vo. Lond. 1817. — *J. G. Spurzheim*, Observ. on Deranged Manifestations of Mind, or Insanity. 8vo. Lond. 1818.; et Observ. sur la Folie. 8vo. Paris, 1818. — *G. Parkmann*, On the Management of Lunatics, with Illustrations of Insanity. 8vo. Boston, 1817. — *J. Sandtmann*, Nonnulla de quibusdam Remediis ad Animi Morbos. 8vo. Berl. 1817.—*J. Johnson's* Medico-Chirurg. Review, vol. i. p. 237., et vol. iii. p. 701. — Ibid. vol. iii. pp. 277. 434. — *A. Duncan*, Letter on the Establ. of Lunatic Asylums. 8vo. Edin. 1818. — *J. C. Reil*, Rhapsodien ueber die Anwendung der Physchischen Curmethode auf Geisteszerrüttungen. 8vo. Hal. 1818. — *E. J. Georget*, De la Folie. 8vo. Paris, 1820.—In Dict. de Méd. (art. *Folie*) t. ix.—*J. C. Prichard*, Treat. on Nerv. Diseases. 8vo. Lond. 1822. — Des Mal. Mentales dans leurs Rapports avec la Législation. 8vo. Paris, 1827. — *Falret*, in Nouvelle Biblioth. Méd. t. iv. p. 72.; et in Archives Génér. de Médécine, t. xx. p. 463. (*On Suicide.*) — *E. Esquirol*, Dict. des Sc. Médicales, t. xvi., t. xxx.—Des Etablissemens des Aliénés en France. 8vo. Paris, 1819; et des Mal. Mentales, considérées sur les Rapports, Médical, Hygiénique, et Médico-Légal. Avec Planches. 2 vols. Paris, 1838. — *G. M. Burrows*, Inquiry into certain Errors relative to Insanity. 8vo. Lond. 1820.; and Commentaries on Insanity. 8vo. Lond. 1828. — *J. P. Falret*, De l'Hypochondrie et Suicide: Considérations sur les Causes, sur le Siège, et le Traitement de ces Maladies. 8vo. Paris, 1822. — *Author*, in Lond. Med. Repos. vol. xviii. p. 438. (*On Suicide.*) — *Cullerier*, in Revue Médicale, t. ii. p. 464. 1824. — *Bayle*, in Ibid. t. i. p. 31. 1825. — *Pinel*, in Ibid. t. i. p. 477. 1826. — *F. Willis*, A Treatise on Mental Derangement. 8vo. Lond. 1823. — *E. Martini*, De la Folie, &c. 8vo. Paris, 1824. — *A. L. J. Bayle*, Nouvelle Doctrine des Mal. Mentales. 8vo. Paris, 1825. — *Hausbrandt*, Journ. des Prog. des Sc. Méd. t. i. p. 268. — *Trelat*, in Ibid. t. v. pp. 158. 233. — *Simon*, in Ibid. t. vii. p. 96. — *Esquirol*, in Archives Générales de Médecine, t. ix. p. 197., et t. xii. p. 195. — *Aegg*, in Ibid. t. viii. p. 574., et t. ix. p. 105. — *Trousseau*, in Ibid. t. xv. p. 562. — *Hayfelder*, in Ibid. t. xxi. p. 466. — *A. Morrison*, Outlines of Lectures on Ment. Diseases. 8vo. Edin. 1825; and Cases of Ment. Dis. 8vo. Lond. 1828. — *J. Guislain*, Traité sur l'Aliénation Mentale, 2 vols. 8vo. Amsterd. 1826; et Traité sur les Phrénopathies, ou Doct. Nouv. des Mal. Mentales, &c. 2d ed. 8vo. Brux. 1835. — *P. S. Knight*, Observ. on the Causes, &c. of Derangement of Mind. 8vo. Lond. 1827. — *E. P. Charlesworth*, Remarks on the Treatment of the Insane. 8vo. Lond. 1828. — *A. Halliday*, General Views of the State of Lunatics and Asylums. 8vo. Lond. 1828. — *R. Gooch*, An Account of some of the most important Diseases peculiar to Women. 8vo. Lond. 1829. p. 108. (*Puerperal Insanity.*)—Edin. Med. and Surg. Journ. vol. xxxi. p. 118., p. 314., et p. 340. — *M. Casper*, in Edin. Med. Journ. vol. xxvi. p. 162. (*Suicide.*) — *Armour*, in Glasgow Med. Journ. vol. ii. p. 355. — *Andral*, in Medical Gazette, July, 1836, p. 662. *et seq.* — *Foville*, in Dict. de Méd. et Chirurg. Pract. t. i. — *J. Conolly*, An Inquiry concerning the Indications of Insanity. 8vo. Lond. 1830. — *J. B. Freidreich*, Literärgeschichte der Path. und Therapie der Phsychischen Krankheiten. 8vo. Wurzb. 1830.—*L. Farrarese*, Delle Malattie della Mente, ovvero delle diverse Specie di Follie. 8vo. 2 vols. Napoli, 1830-2. — *A. Combe*, Observ. on Mental Derangement. 8vo. Edin. 1831. — *E. J. Seymour*, Observ. on the Medical Treatment of Insanity. 8vo. Lond. 1832. — *H. Halford*, Essays and Orations, read and delivered at the Royal College of Physicians. 2d ed. 8vo. Lond. 1833. p. 121. — *D. Uwins*, A Treatise on those Disorders of the Brain and Nervous System, usually called Mental. 8vo. Lond. 1833. — *J. C. Prichard*, A Treatise on Insanity and other Affections of the Mind. 8vo. Lond. 1835. — *D. J. A. Arntzenius*, De Suicidio Observat. Anatomico-pathologicis Illustrato. 8vo. Traj. ad Rh. 1835.—*J. H. G. Schlegel*, Das Heimweh und der Selbstmord. 2 th. 8vo. Hildb. 1835. — *Henke*, in Med. Chirurg. Rev. July, 1836, p. 216. — *Leuret*, in Ibid. April, 1838, p. 531. — *Brierre de Boismont*, in Ibid. p. 533. — *Craigie*, in Edin. Med. and Surg. Journ. Oct. 1836, p. 334. — *W. C. Ellis*, Treatise on the Nature, Causes, Symptoms, and Treatment of Insanity, with Observ. on Lunatic Asylums, &c. 8vo. Lond. 1838. — *T. Mayo*, Elements of the Pathology of the Human Mind. 12mo Lond. 1838.—*M. Allen*, Essay on the Classification of the Insane. 8vo. Lond. — *W. A. F. Browne*, What Lunatic Asylums were, are, and ought to be, &c. &c. 8vo. Edin. 1837.—Physician's Report to the Managers of the Lunatic Asylum of Aberdeen. 8vo. 1838.—*W. Farr*, On the Statistics of English Lunatic Asylums, and the Reform of their Management. 8vo. Lond. — *C. Crowther*, Observat. on the Management of Madhouses, illustrated by Occurrences in the West Riding and Middlesex Asylums. 8vo. Lond. 1838.—The British and Foreign Med. Review, Nos. 10. 13. 17. — *R. G. Hill*, Total Abolition of Personal Restraint in the Treatment of the Insane, &c. 8vo. Lond. 1839.—State of the Lincoln Lunatic Asylum. 8vo. 1839.—Nineteenth Annual Report of the Dundee Lunatic Asylum. 8vo. 1839. — Regulations of the Crichton Institute for Lunatics. Dumfries, 1839. 8vo. — Fiftieth and Fifty-first Report of the Visiting Justices of the County Lunatic Asylum, at Hanwell, and Report of the Resident Physician. 8vo. 1839. — *H. Holland*, Medical Notes and Reflections. 8vo. Lond. 1839. p. 213. — *J. G. Millingen*, Aphorisms on the Treatment and Management of the Insane, with Observations on Asylums, &c. 12mo. Lond. 1840. — *J. B. Cazauvieilh*, Du Suicide, de l'Aliénation Mentale, &c. 8vo. Paris, 1840. —Twenty-sixth Annual Report of the Directors of the Glasgow Royal Asylum for Lunatics. 8vo. Glasg. 1840. — *F. Winslow*, The Anatomy of Suicide. 8vo. Lond. 1840.

INTESTINE — SYN. Ἔντερον (ab ἐντὸς, intus) — Intestinum (from intus, within). — *Intestin*, *Boyeau*, Fr. *Darm*, Ger. *Intestino*, Ital. — *Bowel*; *Gut*; *Intestinal Canal*; *Intestinal Tube.*

1. Most of the *disorders* and *structural diseases* to which the *intestines*, in general, are liable, are discussed in appropriate articles. The seat and nature of these affections required a separate consideration for them; and, at this place, it remains for me chiefly to supply whatever I may have omitted in these articles, and to treat of those subjects, which have not been entered upon under different and more appropriate heads.

2. It need hardly be stated, that the intestines comprise, or consist of the following parts, descending from the stomach to the verge of the anus, namely, the *duodenum*, the *jejunum*, the *ilium*, the *cæcum*, the *colon*, and the *rectum.* As each of these portions of the intestinal canal presents most important connections with, and relations to, other viscera, that are not possessed to an equal degree, or in a similar manner, by the others; as they are, in many respects, and particularly as regards certain of their functions, distinct organs; and as they are often severally the seats of disorders, more or less limited to either of them, so I have treated of the diseases to which each of these portions of the intestinal canal are most liable, under their respective heads. As there are certain maladies, which affect, in some degree or other, more than one of these distinct portions of the bowels, and which often implicate, or even originate in, some one or more of the collatitious viscera, and in which not only the intestines, but the various related viscera, and even the frame generally, frequently are also disordered, although in different grades and forms, and to a varied extent, according to numerous circumstances connected with the cause of the disease, and state and constitution of the individual attacked, so I have treated of these maladies under the names commonly applied to them, but with strict reference to their seats, natures, and pathological relations. Thus, whilst I have considered the diseases individually seated chiefly in either the *duodenum*, *cæcum*, *colon*, &c., under these heads respectively, I have likewise discussed *colic* and *ileus*, *costiveness* and *constipation*, *diarrhœa*, *cholera*, *dysentery*, *gastro-enteric disease*, *flatulency*, *intestinal hæmorrhage*, *intestinal concretions*, and *worms*, &c., in these several articles, because these complaints are not limited, in their seats, to one portion of the intestinal canal only, but often extend to several portions of it, although in different grades, and frequently depend upon disorder of the adjoining viscera, and sometimes even of distant organs, and of the system in general. Moreover, as the *organic lesions* which occur in the intestines are not peculiar to any one portion, but extend, in different maladies and persons, and in different degrees of frequency and severity, to all of them, and even also to the stomach and œsophagus — to the whole digestive canal from the lips to the anus — so I have considered these lesions under the head "DIGESTIVE CANAL," and have thereby avoided the repetitions, into which I should otherwise have been betrayed. It here chiefly remains for me to consider those maladies, seated principally in the *small* and *large intestines* — in the *ileum*, *jeju-*

num, and *colon*, — that are not discussed under different or more appropriate heads. The *functional disorders*, and the *structural changes*, to which the *intestines* are liable, being fully treated of in the articles just mentioned, I now proceed to consider chiefly their *inflammatory diseases*. In the article on the *peritoneum*, however, much will be found more or less intimately connected with inflammations of both the small and large intestines, to which sufficient reference will be also made in those sections, where inflammation extending to the peritoneal coat of the bowels, and the complications of enteritis, are considered.

I. Inflammation of the Small Intestines.— Syn. Χόρδαψος, Εἰλεὸς, Aretæus, Galen. — *Febris intestinorum inflammatoria*, Hoffmann. *Intestinorum Inflammatio*, Boerhaave. *Enteritis*, Sauvages, Vogel, Sagar, Cullen, Pinel. *Empresma Enteritis*, Good. *Cauma Enteritis*, Young. *Gedärmentzündung*, *Entzündung der Gedärme*, *E. der Därmen*, Germ. *Entérite*, *Inflammation des Boyaux*, Fr. *Inflammazione d'Intestini*, Ital. *Inflammation of the Bowels*.

Classif. — 1. *Class*, Febrile Diseases; 2. *Order*, Inflammations (*Cullen*). 1. *Class*, Diseases of the sanguineous Function; 2. *Order*, Inflammations (*Good*). III. Class, I. Order (*Author* in *Preface*).

3. Defin. — *Tenderness or pain of the more central parts of the abdomen, increased on pressure, generally with symptomatic fever, disordered defæcation, and frequently nausea and vomiting.*

4. Inflammation generally commences in one only of the constituent tissues of the small intestines, and frequently continues to be thus limited during its course; but it frequently also extends to the other parts, until even all the textures forming a portion of intestine are implicated. Thus the glandular apparatus, or the mucous membrane only may be inflamed, and the disease may not extend further, although it may exist long, or be extremely acute: but it often, also, invades the other tissues, more especially the connecting cellular tissue, until the peritoneal coat is at last inflamed, and all the phenomena of circumscribed or diffused peritonitis is produced. When all the constituent tissues of a portion of intestine are affected, the inflammation usually has commenced and proceeded in this manner; for it is but seldom that there is reason to infer that the inflammation has either simultaneously invaded all the coats composing a portion of bowel, or has proceeded in an opposite direction, namely, from the peritoneal to the other coats; unless, indeed, in cases of external injury, or of strangulated hernia, or when the inflammation has extended from adjoining parts to the intestines.

5. Inflammation of the intestines, whether limited to one only, or implicating two, or all, of their constituent tissues, may assume any grade of *intensity* and *acuteness*, from the *most acute* down to the *slightest degree* and the *most chronic form*. It may appear, in either of these states, as a *simple* or uncomplicated disease, or *associated* with other maladies. In this latter state, it may be either *primary* or *idiopathic*, or *consecutive* or *symptomatic*. In each of the above forms it will be here considered.

6. i. Inflammation of the Mucous Surface of the Intestines.—*Muco-Enteritis*, of Armstrong. — *Muco-Entérite*, *Entérite Villeuse*, of French pathologists. — This complaint varies in its *characters* with its *intensity*, and with the temperament and habit of body of the patient; a slighter grade of it often causing, in irritable, nervous, and plethoric persons, more acute symptoms than a severer degree in those who are melancholic or leucophlegmatic. The *symptoms*, moreover, are further varied by the extension of the inflammatory affection, in some degree to the duodenal or gastric villous surface on the one hand, or to the internal surface of the cæcum and colon on the other; for the mucous coat of the small intestines is inflamed more frequently in conjunction with one or more of these than in an unassociated form; and not infrequently some one of the adjoining viscera is also more or less disordered. Indeed, the enteric disease may be altogether consecutive of, and caused by, derangement of one or other of these viscera. Thus a discharge of acrid or otherwise morbid bile into the duodenum may occasion or perpetuate inflammation of the mucous surface of the intestines, and often also of the large bowels.

7. *A. Symptoms.* — *a.* In the *acute* or *sub-acute* states of the complaint, the abdomen is usually distended, sometimes tense, and flatulent. A dull or heavy deep-seated pain, or soreness, occasionally with a sense of heat, is felt upon firm pressure, especially around the umbilicus, or towards the right iliac region; but this latter symptom is often absent, and is more generally found when the follicular glands are affected. In the more acute cases, the abdominal parietes are warmer than other parts of the body; and a feeling of internal heat of the bowels is also often complained of, with colicky pains, particularly after cold drinks, and the more heating or indigestible articles of food. Muscular power is much weakened, and the skin is harsh and dry. There is more or less thirst; and the appetite is impaired or lost. In severe cases, or when the disease is far advanced, there is often nausea or vomiting; this latter symptom depending much upon the extension of the affection to the internal surface of the duodenum and stomach. The alvine evacuations are generally morbid, sometimes too frequent, at other times too rare and scanty; but usually preceded or attended by flatulence, borborygmi, and the escape of much flatus. When the internal surface of the large bowels is unaffected, constipation is often present, but short attacks of diarrhœa, occasionally alternating with costiveness, frequently occur. The stools vary in colour and consistence with the state of the biliary functions and the kind of the ingesta: when there is diarrhœa, they are generally pale, yeasty, and crude, or insufficiently digested; when the bowels are costive, they are often offensive, dark, and scybalous. The urine is high-coloured and scanty, and often deposits a copious sediment. The mouth is clammy, with a bitter or unpleasant taste. The tongue is white or yellowish in the centre, but red at its point and edges. The pulse is accelerated, and generally small and soft when there is diarrhœa, and full, or even hard, when the bowels are confined.

8. In more intense or acute cases, the foregoing symptoms are more prominent. The abdominal distension amounts almost to tympanitis; the pulse is quick and constricted; the thirst is great; the tongue is furred, loaded, and dry; the

urine scanty and high-coloured, and all the secretions and excretions diminished. Pain, soreness, internal heat, and tenderness of the abdomen are greatly increased, and the surface is hot, dry, and harsh. The affection of the intestinal mucous surface extends its influence to the cerebro-spinal system, causing sleeplessness, restlessness, and ultimately, in the more unfavourable cases, delirium, startings of the tendons, and in young persons and children, especially, convulsions and coma. In many of these more severe attacks, particularly in the sanguineous temperament and plethoric habits, and in warm climates or seasons, the inflammatory affection of the mucous surface rapidly extends to the external coats of the part of the intestine chiefly diseased; and the form of enteritis about to be noticed (§ 30.) supervenes.

9. Acute muco-enteritis *commences* variously — sometimes slowly and insidiously, with impaired appetite, slight thirst, loaded or white tongue, a slight sense of heat in the abdomen, or colicky pains and slight disorder of the bowels. These symptoms, at first, are hardly appreciable, but they become gradually more and more severe, until the pulse and system become obviously affected. In other instances the attack is more sudden, and severer from the beginning, especially when caused by the more energetic causes, — errors of diet and regimen, by irritating ingesta or intoxicating fluids, by irritating purgatives, by exposure to cold, to currents of air, and by damp or wet clothes. In these latter circumstances especially, it is sometimes ushered in by chilliness or slight rigors. It not infrequently follows some one of the varieties of DIARRHŒA or of COLIC, especially the former, and is often attendant upon it; in such cases, however, the morbid action is seldom confined to the small intestine, but is extended also to the mucous surface of the large bowels.

10. The *progress* of muco-enteric inflammation is seldom very rapid, unless when caused by poisonous substances, and the most intense causes; and then dangerous cerebral symptoms often supervene, or the morbid action extends either to the adjoining portions of the alimentary canal, or to the more external tunics. Its duration most commonly varies from three or four days to thirty or even forty; but thirteen or fourteen days may be said to be its medium continuance. It most commonly *terminates* in resolution, but when neglected, or improperly treated, and in faulty states of the constitution, it often passes into the chronic form (§ 11.) or extends to the other tissues of the intestines, or to the adjoining viscera. A fatal issue generally is owing to this circumstance, or to consecutive affection of the brain, which latter is a frequent occurrence in children, especially in infants.

11. *b. Chronic inflammation of the mucous surface of the intestines* is characterised chiefly by the presence, generally in a slight degree, of the symptoms already enumerated, for a considerable time — for six or seven weeks, or even longer. It may have been consequent upon a more severe state of the disease, or it may have been slight from the commencement, and hence prolonged from this circumstance or from neglect. In many instances, little or no abdominal uneasiness, or pain, or heat, or flatulency, or distension, is felt until three or four hours after a meal. Chronic muco-enteritis is exasperated by indigestible articles of diet, by a heating regimen, warm condiments, and by stimulants. Thirst, dryness of the lips and mouth; harshness and dryness of the skin; flatulency, borborygmi, and costiveness, the motions being scybalous, dry and dark, sometimes alternating with slight diarrhœa; abdominal distension during digestion, and slight evening fever, are generally complained of. The occurrence of abdominal pain, tenderness, thirst, heat of skin, acceleration of pulse, and lassitude, after the principal meal, imparts to the complaint an intermittent or remittent character, which may mislead an inexperienced practitioner. In some cases soreness and fissures of the lips, with exfoliation of the epithelium, are observable, and the cuticle often is thrown off in minute pulverulent scales.

12. *c. In children, muco-enteritis* is one of the complaints most frequently observed. It occurs in either an *acute*, *sub-acute*, or *chronic* form. In slighter as well as in severer states, it is common in the youngest *infants*, more especially in large or manufacturing towns, and in the more delicate subjects; in whom, however, the morbid action usually extends to the stomach on the one hand, and to the large bowels on the other, in a more or less marked form, at some period of its course. Indeed many of the *diseases of infancy and childhood* are merely consecutive upon neglected states of this complaint, more especially cerebral maladies and convulsions, infantile remittent fever, disorders of the liver, mesenteric obstructions and enlargements, peritonitis, scrofula, and diseases of the glands and joints.

13. *a. In infants* at the breast muco-enteritis may, even in the *acute* and *sub-acute* states, be attended by very little febrile disturbance. In them the symptoms vary with the parts of the digestive canal principally affected. When the small intestines are only implicated, there is generally vomiting, tympanitic distension of the abdomen, and tenderness upon firm pressure, with heat of skin, and slight or occasional diarrhœa. When the morbid action extends to the colon there is more severe or continued diarrhœa, much less abdominal distension and tenderness, and less frequent or no vomiting. In many cases of this class of patients an erythematous redness is observable around the anus. The tongue is dry, or loaded, and red at the point or edges, and sometimes over the whole surface. The stools are various, but frequently consist of a yellowish substance. There are also thirst, dryness of the skin, and agitation; but the pulse is often not much affected.

14. During the period of *dentition* infants are often attacked in a still more severe manner. In many the complaint commences insidiously with slight diarrhœa and flatulent distension of the abdomen, and proceeds in this manner for some time, until it assumes a well-marked form. The evacuations are occasionally not more frequent than usual; sometimes they are three, four, or five in the twenty-four hours, but they are loose, and more or less disordered; and all the local and constitutional symptoms are severe. In the fully developed state of the complaint there are heat of skin, fretfulness, thirst, dry tongue, disturbed sleep, sometimes vomiting, accelerated pulse, abdominal tenderness on firm pressure, and distension, crying and agitation before passing a stool, which is often forcibly ejected with much

flatus. The evacuations vary remarkably in the course of the disease, from a healthy to a clay-coloured, yeasty, pale, and slimy, or to a greenish, or brownish, or reddish, watery and dark state. They sometimes consist of a dark fluid; at other times, of a dark or reddish-brown mucus. Their appearance is, however, much influenced by the food and medicine taken, much of the former passing off in the stools, but little or not at all changed. This acute state of disease may continue for some time; but great exhaustion, rapid pulse, dry or crusted tongue, sunk eyes, pallid or waxen countenance, coma, and partial or general convulsions, frequently supervene and terminate existence. In infants and young children, this state of the disease may exist for a considerable time, and even with much severity, without fever being unequivocally developed. Vomiting, diarrhœa, colicky pains, flatulent distension of the abdomen, tenderness on firm pressure, and often increased heat, especially of the belly, are the symptoms which chiefly indicate, in this class of patients, the presence of acute muco-enteritis. Frequently the two first of these symptoms alternate.

15. In infants who are either prematurely *weaned*, or are attempted to be brought up by hand, or otherwise insufficiently or improperly fed, this complaint is very prevalent. Indeed, it is much more common than any other; and in it nearly all the other diseases, to which infants thus circumstanced are liable, actually originate; these arising consecutively in consequence of sympathetic disturbance, and the intimate connexion subsisting between the vital organs, by means of the organic nervous system. The complaint, commonly called the "*Weaning Brash*," is merely a modification of acute muco-enteritis, in which the irritation of inappropriate or unaccustomed food not only induces a degree of inflammatory action, but also an increased secretion, this latter often, however, favouring the resolution of the morbid vascular action. In this complaint the essential symptoms are those just described, varying, however, in different cases, according as the inflammatory irritation is extended either to the stomach, in the form of GASTRO-ENTERITIS, or to the large bowels, in the form of ILEO-COLITIS, hereafter to be noticed. However modified this disease may be in children, by peculiarity of constitution, by combinations of the causes, and the extent or intensity of the morbid action, it has a most manifest influence, in all its forms, to induce sympathetic or consecutive inflammation of either the membranes or the substance of the brain, or even both, and disease of the mesenteric glands. After weaning or dentition, acute muco-enteritis sometimes assumes a form which is with difficulty distinguished from the acute variety of *Infantile Remittent Fever*. Indeed the one complaint often runs into the other; and the more severe state of the latter disease is frequently *complicated*, as will hereafter be shown, with the former, a fatal issue in these being generally owing to this complication.

16. *β. Chronic muco-enteritis* is also frequent in *infants* and young *children*. It is more generally attended by diarrhœa in them, than in adults; the dejections being glairy, watery, and greenish. The belly is tympanitic and large; and, as the disease continues, contrasts strongly with the emaciation of the extremities. About one or two hours after a meal, fretfulness or uneasiness with depression may be remarked, occasioned by an increase of ailment when the ingesta are passing along the ilium. There are also thirst, dryness of skin, and often increased heat of the abdomen, especially towards evening. The pulse is sometimes accelerated, and generally small and soft. Tenderness or soreness is frequently evinced upon firm pressure of the abdominal regions, or upon examination of them by *percussion*. This state of enteritis in children seldom continues long without super-inducing enlargement and obstruction of the mesenteric glands, and the usual consequences of these lesions. It is often also a *complication* of the more chronic states of *Infantile Remittent Fever*, and not infrequently the former complaint is mistaken for the latter, the exacerbations attending it arising from the effect of food upon the character of the symptoms, or from the constitutional effects of irritations of a vital organ, and the periodicity which the slighter forms of febrile action are prone to assume, especially when the local affection commences in a slight form and advances slowly.

17. ii. INFLAMMATION OF THE GLANDS OF THE INTESTINES. — *Glandular Enteritis* (Author). — *Entérite Folliculeuse*, of French writers. — Inflammation of the *solitary* and *aggregated* (PEYER's) *glands* and of the *simple follicles* (LIEBERKÜHN's) — is rarely observed as a primary disease, unless as a consequence of a peculiar class of causes, which operate not merely locally in respect of the alimentary canal, but also upon the system in general. It is scarcely ever a simple or an unassociated malady; but generally a consequence of an antecedent morbid condition, either of some other vital organ, or of the constitution — a result of an important lesion of the vital energy, and of the circulating and secreted fluids. *Follicular* or *glandular enteritis* is to be viewed rather as a *consecutive* or *symptomatic affection*, than as a primary and simple disease. Yet it has been considered by several pathologists, and particularly by MM. LOUIS, ROCHE, and others, as a primary malady, and the essence of the typhoid forms of fever. That it forms a most important complication of continued, and even of remittent, fevers is undoubted, as I have already shown (see FEVER, § 462.), especially in certain epidemics, and in those localities, where the causes which act more directly upon the alimentary canal cooperate with other predisposing and exciting causes of fever. Thus it was a most prominent feature in the epidemic *Mucous Fever* (see FEVER, § 406.), described by ROEDERER and WAGLER, and in that denominated by M. BRETONNEAU *dothinentérite*, and *ileo-dyclidite* by M. BAILLY. It is frequently observed in *adynamic*, *putro-adynamic*, and true *typhus* fevers, and is seldom absent when these fevers assume the enteric character or complication; and which they are prone to assume when they arise from those concurring or exciting causes, which either act injuriously on the alimentary canal, or contaminate the circulating fluids; as putrid food, water containing decayed animal or vegetable matter, &c. It exists also, but in connexion with inflammation of the follicular glands of the *cæcum*, *colon*, and *rectum*, in the adynamic forms of DYSENTERY § 20. *et seq.*), as will be more fully shown in the sequel. Glandular enteritis, occurring consecu-

tively of, or as a complication of low fevers (see FEVERS, §§ 453. 474.), necessarily assumes, in its course and consequences, an acute character; but it also occurs consecutively of other diseases, more especially of tubercular consumption, of tubercles in various organs, and of scrofulous disease of the joints, bones, and glands; and in all these symptomatic relations it presents a chronic form.

18. In its *primary* and *simple states*, *glandular enteritis* cannot be advantageously viewed without reference to its special causes. These are, as respects *predisposition*, the female sex; the earlier epochs of life, particularly those antecedent to puberty; relaxed and lymphatic constitutions; the scrofulous diathesis; and persons possessing a fine white skin, a fair complexion, and light hair. The more *efficient* or *exciting causes* of follicular enteritis are also peculiar. These are a cold and humid atmosphere; low and damp localities; an air contaminated with vegetable and animal miasms; the use of water rendered impure by putrid animal or vegetable matters or exuviæ; immature, or stale, or decayed fruit or vegetables; animal food passing into a state of putridity or decay; all septic substances taken into the stomach; immature or spoilt, or musty wheat or rice; damaged or mouldy bread, biscuit, &c.; the prolonged use of purgatives, and whatever impairs vital power, and deteriorates the chyle and the circulating fluid. MM. BRETONNEAU, LEURET, and GENDRON, consider that cases originating in one or more of these causes may generate an effluvium which may infect healthy persons. There can be no doubt that these causes, when they operate upon a number of predisposed persons, and in circumstances favourable to their injurious impression, and to the accumulation of the emanations proceeding from the diseased, will produce a disease capable of propagating itself in these circumstances; but the disease will either be dysentery, or fever with enteric complication, as shown in numerous instances, particularly where these circumstances have been aided by the endemic influences just alluded to, and by epidemic constitutions.

19. *A. Symptoms.*—*a.* In the *sporadic* and *simple* state of glandular or follicular enteritis, the patient frequently complains at first only of slight disorder of the digestive functions, consisting chiefly of want of appetite, colicky pains, and relaxation of the bowels, ceasing and recurring from time to time. There are also borborygmi, flatulence, mucous stools, a relish chiefly for the more stimulating articles of food, a white or loaded tongue, a soft and languid pulse, and a turbid state of the urine. In other cases the symptoms are more severe at the commencement. The appetite is lost; the tongue presents a greyish-white or a yellowish coating, and is somewhat red at its point and edges; the mouth is clammy, occasionally aphthous, with an insipid, sickly, nauseous, or sour taste; the breath is disagreeable and fœtid; and there is tenderness upon firm pressure around the navel. Borborygmi, and eructations of an acid and nidorous flatus; colicky pains often followed by flatulent and mucous evacuations, occasionally containing lumbrici; great depression of strength; dusky discoloration of the skin; occasional outbreaks of slight but acid perspiration; and a small, frequent, and feeble pulse, are generally also present at an early period. There is little or no heat of skin, and but little thirst. Shifting pains in the limbs are often felt. The urine is thick or turbid, and deposits a greyish or brick-coloured sediment. Diarrhœa is neither severe nor of any continuance, unless the glands of the large intestines are also affected.

20. *b.* In its more *acute* or *severe states*, the affection of the glands is seldom confined to the small intestines, or to the solitary glands, or to PEYER's glands, or to the simple follicles solely, although either may be chiefly diseased. In the more complicated cases, particularly those presenting the forms of adynamic fever and dysentery, PEYER's or the aggregate glands, are principally implicated: and the disease extends from the lower third of the ileum, where it is most prominently marked, to the simple follicles and solitary glands of the large bowels, on the one hand, and to those of the upper portions of the intestinal canal, on the other. In these more acute states, severe pain in the abdomen, often extending from the navel to the right iliac or cæcal region, and increased on pressure; a loaded tongue, with dryness of the mouth, and thirst; symptomatic fever which becomes increased towards evening, with a dry harsh skin; depression of spirits; disinclination to move; a dull and often a sunk state of the eyes, and discoloration of the lips and around the mouth, are usually present, and are commonly attended by fulness or flatulent distension of the abdomen in general, or more especially towards the cæcal region; by nausea and occasionally vomiting; and by frequent, mucous, offensive, ochrey or otherwise morbid stools, and scanty urine. As the disease proceeds, it usually assumes all the characters either of *Asthenic* DYSENTERY, or of *Mucous* or *Adynamic* FEVER (see these articles), in a severe and more or less advanced form, according as the affection extends along the digestive canal, or gives rise to exhaustion of the cerebro-spinal functions, and to deterioration of the circulating and secreted fluids. When it assumes any of the forms of *Asthenic* or *Adynamic Dysentery* (see DYSENTERY, §§ 20. *et seq.*), the cæcum, colon, and rectum are especially implicated; and when it passes into adynamic fever, the aggregated glands, particularly in the lower third of the ilium, are extensively diseased, ulceration extending from them to the more external tissues.

21. *c.* Inflammation of the intestinal mucous follicles often assumes, particularly in low and humid localities, and when occurring epidemically or even endemically, as occasionally observed, especially on the Continent, either the form described under the article *Mucous* FEVER, or that very closely resembling it, denominated by M. PETIT *Entero-mesenteric Fever;* and which is described by him nearly as follows: — There are at first debility, general uneasiness, anorexia, irregular attacks of fever, and diarrhœa. The countenance is dejected, the eye dull, and the skin pale or slightly livid, particularly about the lips and near the alæ nasi; decubitus on the back; disinclination to motion; torpor, and some degree of prostration of the intellectual powers. The fever is slight or obscure during the day, but gradually comes on in evening paroxysms, without rigors or much heat, but with a dry harsh skin, injection of the eyes, and slight delirium. There is great

thirst; the teeth are dry; and the tongue is covered with a greyish paste. The stools are bilious or serous, variable in frequency and quantity, but are not such as to account for the prostration of the patient. The belly is soft and not swollen; and little or no pain is felt in it, unless on pressure towards the right side, between the umbilicus and the crest of the ilium. The symptoms are gradually increased; the lips and alæ nasi are slightly retracted; the cheeks become livid, the eyes sunk and injected, and somnolence and delirium constant, although the answers are correct, but painful. Continued fever, with nocturnal exacerbations, petechiæ, and subsultus tendinum now appear; the pulse is frequent, and very compressible; the teeth are covered by sordes, and the tongue with a brownish or black crust. The abdomen becomes more painful; sometimes, however, the pain is confined to its first situation, and is unattended by distension; but in other cases, it is more extended, and is accompanied with tympanitis. The stools become serous, fœtid, and frequent; the urine scanty; and excoriations of the nates, or the situations of blisters are disposed to gangrene.

22. *d.* In many cases, glandular enteritis is *consequent upon fevers*, or occurs during convalescence from them. This *sequela* has presented itself more frequently after some epidemics, and in certain localities, than in others. It has been well described by Dr. CHEYNE, in his Reports, as it appeared in Dublin, in 1817. A patient in fever has become so much improved that a speedy convalescence is expected, but in a few days it is found that strength is not returning: the pulse continues quick, and the appetite, although sometimes restored, is oftener deficient or capricious. The patient expresses no desire to leave his bed, and he does not gain flesh. His tongue becomes dry, and he complains of a dull pain and uneasiness in his belly, with soreness on pressure, and a degree of fulness. To these succeed looseness of the bowels, with great weakness. Probably at the next visit, the patient is found lying on his back, with a pale sunk countenance, and a very quick pulse; and without mental energy. Mucous stools pass from him in bed, and the urine also. His breathing becomes frequent, and often hiccup occurs. Death is now nearly at hand; opiates, astringents, and cordials being alike unavailing.

23 *e.* In the more severe cases, and particularly when they assume either of the above forms, the abdominal or local symptoms occasionally become suddenly exasperated. The patient complains of violent pain in the abdomen, which is greatly distended, tense, and tender on the slightest pressure. He lies on his back, with his knees drawn up. His countenance is anxious and collapsed; his pulse is weak, small, remarkably accelerated, followed by extreme depression and sinking, by quick laboured breathing, cold extremities, and occasional hiccup. Death in these cases commonly takes place within 24 or 36 hours, from the accession of the severe pain and tympanitis; and is owing to ulcerative perforation of the intestines and consequent peritonitis rapidly extending over the greater part of the peritoneal surface.

24. *f.* In other instances, *intestinal hæmorrhage* occurs in the course of the disease, and sinks the patient more or less rapidly, according to its amount relatively to his powers, &c. In these cases, especially if the blood is poured out slowly in the small intestines, and in small quantity, it is more or less intimately mixed with the other matters passed by stool, and the evacuations are generally more frequent and abundant than in other circumstances. Intestinal hæmorrhage, particularly when the blood is more or less pure, is, however, much more frequent when ulceration has taken place in the large intestines.

25. *g.* Follicular or glandular enteritis may, particularly when occurring in a simple and sporadic form, assume a more or less *chronic* or *sub-acute state.* But in either of these states it will hardly be distinguished from the more chronic forms of muco-enteritis already noticed (§ 11.), unless by a more offensive mucous or muco-puriform state of the stools, and a weaker and more frequent pulse; but these cannot be relied upon. Very often, also, muco-enteritis and follicular enteritis are associated, especially in children. Enteritis consequent upon tubercular consumption is commonly seated chiefly in the follicles, and is chronic in its duration; but it is seldom limited to the small intestines; it generally extending also to the cœcum and colon.

26. *h.* The *progress* of the simple and sporadic states of follicular enteritis is generally slower, and the *duration* of it consequently longer, than the progress and duration of similar grades of muco-enteritis. It seldom proceeds to ulceration, or the ulcerative process rarely proceeds far in the situation of these glands, without giving rise to *inflammation and enlargement of the mesenteric glands corresponding to the diseased intestinal glands and follicles.* Indeed, it is not improbable that consecutive inflammation, enlargement, and obstruction of the mesenteric glands often arise before the follicles and glands become ulcerated, and yet are owing to the primary disease of these follicles and glands.

27. *i. In infants and children*, glandular enteritis is a very frequent disease, particularly amongst infants that are brought up by hand, or imperfectly nourished, or injudiciously fed, and that live in close, low, and damp cellars and localities, especially in large and manufacturing towns. It is frequent also at the time of weaning, and in humid, cold, and miasmatous situations. It often assumes a slight and chronic form, and then generally occasions mesenteric disease, which very frequently occurs consecutively upon either follicular or muco-enteritis, particularly the former. These two forms of enteritis are with great difficulty distinguished from each other in children or infants. Nevertheless, an opinion as to the presence of either may be formed from the descriptions furnished above (§ 12—19.) In the follicular variety, the stools are more generally mucous, and the diarrhœa is more marked than in the other variety. Indeed, *mucous diarrhœa* in children is very commonly caused by inflammation of the intestinal follicles and glands, or by a state of irritation which is very prone to pass into inflammation, which will assume either a slight and chronic, or a severe and an acute, form, according to the constitution of the patient, and numerous concurring circumstances. In the more acute cases, there is more or less fever, which generally assumes a remittent character; and it is sometimes attended by nausea or vomiting, and always by thirst.

The abdomen is tumid, uneasy, although not always painful or tender on pressure. Griping pains are often felt, especially before an evacuation; but there is no straining, unless the large bowels become implicated; and this often is the case as the disease proceeds; and it then assumes a truly dysenteric character, the stools often consisting of a reddish-brown mucus.

28. *k.* The more *slight* and *chronic states* of follicular enteritis in children are apt to be overlooked, or seldom come under the eye of the physician until it has passed on to organic change, generally to enlargement of the follicles or incipient ulceration, with consecutive disease of the mesenteric glands. The chronic state of the affection is often the consequence of its slightness or its gradual increase, which causes it to be neglected, or injudiciously treated, in respect both of regimen and of medicine. It is frequently also produced in connection with the more slight or chronic form of muco-enteritis; and it often proceeds from morbid states of the chyle and blood — or at least from causes which operate chiefly by deteriorating these fluids. The chronic affection is ascertained with difficulty in children and infants, especially during its early stages. It closely resembles not only the chronic form of muco-enteritis, but also *infantile remittent fever* and *mesenteric decline.* Indeed, the remittent fever may be altogether symptomatic of it; or it may be developed in the course of the fever. I have seen cases, both in public and in private practice, conclusive of this intimate connection — of these sequences of morbid action. The advanced state of the chronic disorder may not differ from mesenteric disease; for the former is rarely of long continuance without superinducing the latter. In many cases, the affection of the glands and follicles is slowly produced in consequence of general cachexia, or of a morbid condition of the circulating fluids; the constitution, especially the soft solids and surface, manifesting general disease, and the digestive organs more or less disturbance, the stools being mucous, offensive, or otherwise morbid. — In children, as well as in adults, it commonly supervenes, and proceeds to extensive ulceration, during the progress of tubercles of the lungs, and in the course of hectic or slow fever proceeding from the absorption of morbid matter or diseased secretions, or from local sources of irritation.

29. *l.* The *chronic form* of glandular enteritis may *terminate* in *perforation* of the intestines, and in partial or general *peritonitis*, mesenteric disease having been previously developed, and more or less advanced; but I believe that perforation is a less frequent consequence of the chronic, than of the more acute or sub-acute, states of the disease. When consequent upon the chronic form, it is chiefly when this form arises from tubercles in the lungs, or when it occurs in the scrofulous constitution. (See art. Digestive Canal, § 38. *et seq.*). — *Hæmorrhage* from the intestines is probably also less frequently caused by the chronic, than by the acute states of the follicular disease — at least according to my observations, although I have met with several instances of its occurrence in the chronic variety, consequent upon tubercles and ulceration of the lungs.

30. iii. Inflammation implicating all the Coats.—*The Enteritis Phlegmonodea* of Cullen; — *E. Iliaca* of Sauvages; — *Sero-enteritis* of modern writers. — *Inflammation extending to the cellular, and affecting all the tunics, especially the peritoneal.* — This variety of enteritis is *characterised* chiefly by the severity and continued duration of the pain of the abdomen, particularly around the navel; by frequent vomiting and great tenderness and tension of the belly; by the very accelerated, constricted, small, and even cord-like, pulse; by the marked tendency to constipation; and by the severity of the accompanying fever. As the inflammation extends to the peritoneum, or in proportion as this coat is affected from the commencement, these symptoms are prominent, but in various grades of severity, according as the disease is consequent upon muco-enteritis, or upon strangulation, or upon inflammation of some adjoining viscus, and according to the causes which have directly produced it. *Sero-enteritis* may thus be either *primary* or *consecutive; acute* or *sub-acute;* but very rarely *chronic*, unless in a particular form, in connection either with chronic ulceration of the intestines, or with chronic peritonitis.

31. *Description.* — *A. Acute sero-enteritis*, or *phlegmonous enteritis*, may occur *primarily*, particularly in warm or in tropical countries, and in warm seasons in temperate climates; but it more commonly is *consequent* upon some grade or other of muco-enteritis, although the symptoms of the latter may have been overlooked, or have not fallen under the observation of the physician. When it occurs primarily it is generally ushered in by chills or rigors: but when it is developed more gradually, owing to the extension of inflammatory action from the mucous to the cellular tissue, and thence to the peritoneal coat, then it is evinced by the appearance of the more acute and characteristic symptoms. — *a.* In the early stage of the disease, more especially if it be ushered in by rigors, there is great vascular and febrile excitement, which passes into exhaustion with a rapidity proportioned to the degree of the previous excitement and to the progress of the inflammation and of its consequences. Pain and tenderness of the abdomen are early felt, particularly under pressure, during which the patient winces, and evinces increase of pain or anguish by the expression of his face. The abdominal integuments become hard, irregular, tense, harsh, and hot, and the whole abdomen tense and distended, chiefly by flatus, which the patient feels to increase his sufferings. As the tenderness increases he is more constantly on his back with his legs drawn up, as if instinctively to relax the muscles and to keep off the pressure of the bed-clothes from the belly. If nausea, retching, or vomiting does not appear at the commencement of the attack, they are sure to occur as it proceeds, and to increase in severity with its progress. Constipation is obstinate in proportion as the more external tunics are affected; and the more obstinate it is, the more urgent is the vomiting, which often occurs either without being excited by the ingesta, or a considerable time after substances have been taken into the stomach. The urine is scanty and high-coloured. The skin is hotter than natural and always drier, excepting on the forehead and palms of the hands, where it is often moist. The pulse is very quick; generally from 100 to 120, or even quicker in the more intense cases, and at a

far advanced period. It is small, constricted, resisting, and firm; but as exhaustion comes on, it becomes small, thready, and weak. The respiration is quick and anxious, and chiefly effected by the diaphragm and intercostals, the abdominal muscles acting slightly or almost imperceptibly. The tongue is covered by a whitish fur, and there is excessive thirst.

32. *b.* As the vascular and febrile excitement passes into *exhaustion*, the abdomen becomes more distended and tense, and the pain and tenderness which had recently been most intense, subside more or less rapidly. The concentration of heat in the abdomen still continues; whilst the temperature of the extremities sinks. Respiration now becomes laboured; retching and vomiting more frequent, and the countenance more anxious and collapsed. As the stage or period of exhaustion is more fully evolved, the pulse is remarkably quick, generally ranging above 120, and weak, small, thready or undulating. The heat of the surface falls remarkably on the extremities, which are damp and clayey cold, and ultimately even on the trunk. The hands and feet often appear mottled with dark-red or livid spots. Respiration is irregular, embarrassed, or interrupted by catchings or hiccup. Vomitings occur without retchings or effort, the contents of the stomach being discharged by a retrograde action, or by a gulping-like motion. The tongue is dry, brown, and furred; the face is sunk, the orbits hollow, and muscular power altogether prostrate. This state continues but a short time, until the patient sinks, generally with a collected mind, and sometimes with hopes of recovery entertained until almost the last moment, or after all hopes have ceased to inspire the practitioner.

33. *B. Sub-acute sero-enteritis* differs from the acute chiefly in the severity of the symptoms and in their duration. The abdominal symptoms are less severe in this than in the acute form; and the attendant fever is also less. The *acute* variety is seldom protracted beyond the sixth or seventh day, very often not beyond the fourth; whereas the *sub-acute* may be prolonged, to twelve, fifteen, or even twenty days. The rapid progress even of the latter, and still more of the acute, should not be forgotten; nor their almost constant tendency to terminate fatally; as these circumstances most unequivocally prove the necessity for adopting a most active, decided, and a judicious treatment, at the commencement of the disease; for, when exhaustion begins to appear, every means will be inefficacious.

34. Although acute and sub-acute phlegmonous or sero-enteritis most frequently arises from the extension of inflammation from the mucous coat to the connecting cellular tissue, and thence to the external tunics of the intestines, yet these tissues may be almost coëtaneously affected, or the inflammation may commence in, or extend to, the serous coat, and thence to the rest. This latter is most likely to be the case when sero-enteritis appears consecutively upon external injuries, upon inflammations of adjoining parts, and upon strangulation, &c. — *Death*, in the unfavourable cases of acute and sub-acute sero-enteritis, is commonly caused by the extent to which inflammation and its consequences has proceeded in a vital organ, and by the shock imparted to the organic nervous power, by intense disease of a viscus most intimately connected with this vital part of the nervous system.

II. Inflammation of the large intestines.— Syn.— *Colitis, Colite,* Fr. *Eine entzündung des Kolons,* Germ.

Classif.—III. *Class.* I. Order (*Author*).

35. Defin.— *Pain and tenderness in the course of the colon, commonly originating in the region of the cæcum, and extending to the left iliac region and sacrum; with frequent, and often ineffectual, efforts at fæcal evacuation, generally preceded by tormina, and attended by tenesmus, the motions being mucous and streaked with blood; symptomatic inflammatory fever.*

36. The *cæcum* is sometimes primarily inflamed, without the disease advancing to a great extent either to the small intestines, on the one hand, or to the colon, on the other. This limitation of the inflammation to the cæcum is, however, comparatively rare, especially when its mucous surface is the part of it affected. *Inflammation of the cæcum,* particularly when thus confined, is fully treated of in the article Cæcum (§ 15.). When inflammation commences in this viscus, it generally extends to the colon, and even to the rectum; less frequently, it extends also to the ilium. When this latter intestine is inflamed, especially when its villous surface or its follicles are chiefly affected, the cæcum often participates in the disease, which frequently advances also to the colon and rectum. Such is the case in the several varieties of Dysentery, which, in most instances, either commences with, or soon passes into, inflammation of the mucous surface of the large intestines extending often to the ilium. In the purely inflammatory form of dysentery, the local morbid action is of the sthenic kind, and the accompanying fever also of this nature. In the low, adynamic, infectious, and epidemic forms, the local action is asthenic, and the attending fever of a low or typhoid character. In most of the forms of dysentery, there are portions of the large intestines somewhat more severely implicated than others, and these are the internal surface of the cæcum, of the sigmoid flexure of the colon, and of the rectum. The other portions of the colon and the ileum are likewise inflamed, but generally in a less degree, unless in very severe or protracted cases where they also present very remarkable lesions. In the different states of dysentery, also, the follicular glands as well as the mucous surface itself are affected, although probably in different degrees, particularly at the commencement of the complaint, at which period, however, dysentery is not always identical with inflammation of these parts, for dysentery, particularly in its asthenic, endemic, and epidemic appearances, usually commences with indications of morbid secretion and of inordinate action of the muscular coats of the intestines—with signs of irritation chiefly; inflammatory action either of a sthenic or asthenic kind being consecutive. However, in many of the more acutely and sthenically inflammatory cases, and especially in those which occur sporadically, and from causes which will hereafter be noticed, this disease is truly inflammation of the villous surface of the large intestines, seated, in some cases, chiefly in the colon and rectum; in others, in the cæcum and colon;

and, in many, in these three parts equally, and extending also to the ilium; but in all, the morbid action is not limited to the villous surface itself, nor to the follicular glands solely of these intestines, although it may commence in either, or be more prominent in one or the other.

37. *Inflammation of the Colon — Colitis* — which will be chiefly considered at this place, as *Inflammation of the* Cæcum, and *Inflammation of the* Rectum, are discussed in separate articles — generally *commences* in the villous or mucous surface, or in the follicles, and comparatively seldom in the cellular or connecting tissue of the coats of this bowel, or in the peritoneal coat. It may, however, originate in either of these latter, as in the case of *phlegmonous enteritis* (§ 30.), when it has been caused by wounds or external injuries, by strangulation, or has occurred consecutively upon inflammation of an adjoining viscus, or of the peritoneum, or of the omentum or mesentery.

38. *A. Symptoms of Acute Colitis.* — When the inflammation commences in the villous surface, as is usually the case, the bowels are at first loose or irregular, or mucous diarrhœa is present; feculent evacuations being first passed. In this state there may be neither chills nor rigors, or they may be slight. When, however, the coats of the bowel are more deeply and acutely affected, the disease is usually ushered in with rigors and chills. Pain and tenderness on firm pressure are generally felt in the course of the colon, extending from the cæcal region to the right hypochondrium, across the abdomen, midway between the pit of the stomach and navel, to the left side and left iliac region. The pain occurs in paroxysms, is often griping, and followed by an inclination to go to stool, the evacuations consisting chiefly of mucus with blood. If there be straining or tenesmus, with pain in the direction of the sacrum, the inflammation has extended to the rectum. If inflammation of the large bowels assumes a *sub-acute form*, it is attended by the same symptoms, and it observes the same course, as stated in the article Dysentery, at the place where the sthenic or inflammatory states of that disease are described (§ 11—16.). If it be very *acute*, it will differ but little, if indeed at all, from the variety of *dysentery* (§ 17. *et seq.*), observed so frequently in Europeans in warm and inter-tropical countries. Indeed, the chief differences between *colitis*, or inflammation of the colon, and inflammatory dysentery, arise from the extension of the morbid action, in the latter, to the rectum on the one hand, and to the cæcum, and even also to the ileum, in some cases, on the other. When, however, the rectum is unaffected, there will neither be straining, nor pain at the sacrum, the other symptoms attending acute inflammatory dysentery remaining; the inflammation of the rectum, in connection with colitis, occasioning some of the chief characteristics of inflammatory dysentery. (See article Rectum.)

39. When inflammation has invaded all the coats of the colon, either by extending from the internal surface to the peritoneal coat, or from the latter to the other tissues, or by attacking them all nearly coëtaneously — the second and third modes being, however, comparatively rare — then pain, increased heat, and tenderness in the course of this viscus, become more severe and constant, and extend over the abdomen; flatulent distension of it increases, particularly in parts; the stools are preceded by tormina — are frequent, scanty, mucous or slimy, very dark, streaked with florid blood — contain either scybala or broken-down fæces — are passed with much flatus — and are at last fœtid, with shreds of lymph or muco-puriform matter in them. The tongue varies in its appearance, but it usually becomes covered with a dark sordes, which forms into a crust as the disease proceeds. The mouth is dry: there is constant thirst, and occasionally vomiting. The urine is scanty and high-coloured, and the calls to pass it, frequent and painful. The pulse is quick, hard, and small, and ultimately small and weak. The heat, pain, tenderness, and flatulent distension of the abdomen go on increasing: and the disease, in most respects, excepting the dysenteric symptoms, assumes the features of the worst cases of *sero-enteritis* (§ 31.), or passes into a state of *partial* or *general* Peritonitis, or becomes identical with the far advanced stage of the most acutely inflammatory form of Dysentery (§ 17.); the local and constitutional symptoms, attending the unfavourable terminations of these, particularly of the last, also accompanying similar terminations of it. As colitis, however, appears more frequently associated with other diseases, than as a primary malady, especially with inflammations of other parts of the alimentary canal, or with those of the liver, omentum, peritoneum, &c.; and as it occurs in a variety of endemic and epidemic circumstances, and in various states of the constitution, so both the local and constitutional symptoms vary in different cases, and even in different stages of the same case. Still the pain, heat, distension, and tenderness in the course, or in some part, of the colon, in connection with the state of the stools and the severity of the local and constitutional disturbance, will sufficiently mark the presence of the disease.

40. *B. Chronic inflammation of the colon — chronic colitis* — is either consequent upon the acute or sub-acute states of colitis, or is itself a primary disease, the chronic condition proceeding from its slight grade and slow progress. As it usually occurs in practice it is identical with the *sub-acute or chronic forms of* Diarrhœa and Dysentery (§ 45. *et seq.*), the symptoms varying much according to its complications, and the circumstances of the locality in which it prevails, and of the individual affected, as above stated (§ 39.). Its most common complication, however, is with sub-acute or chronic disease of the liver, with abscess in this organ, and with disease of the mesenteric glands; but it may attend other diseases, particularly tubercles in the lungs. The symptomatic fever, in this state of colitis, is very frequently of a remittent or hectic type; and it often, particularly in warm and miasmatous climates, occurs in the course, or as a sequela, of intermittent and remittent fevers.

41. Chronic colitis generally occasions, and becomes associated with, chronic inflammation of the ileum, the disease affecting chiefly either the mucous surface, or the follicles of this intestine; but in this case, the cæcum also is more or less implicated. As this state of colitis proceeds, ulceration takes place; and the inflammation advances in parts, through the medium of the connecting cellular tissue, to the peritoneal coat,

coagulable lymph being thrown out on its surface, and giving rise to adhesions, &c. Similar changes, although to a less extent, also take place in the adjoining portions of the alimentary canal; and the disease *terminates* either in partial or in general peritonitis, or in thickening and constriction of the coats of the intestine, or as more fully described in the article DYSENTERY (§§ 48—58.).

III. INFLAMMATION OF BOTH SMALL AND LARGE INTESTINES. — *Ileo-Colitis* — *Entero-Colitis*, of various authors. *Ileo-Colite* — *Entero-Colite*, Fr. *Entzündung des Ileums u. des Colons*, Germ.

42. This is a frequent form of inflammation of the intestines — the morbid action affecting the ilium and colon solely, but in different grades in either, or extending also to the other portions of the small and large intestines, although in various degrees. It is probable, however, that the disease is not limited long to the ilium and colon, without the rectum being more or less affected; and we cannot reasonably exclude the cæcum from an equal share of the malady, when the ilium and colon are attacked. Indeed there is reason to believe that the *cæcum* is sometimes the part first affected, inflammation extending to the colon, on the one hand, and to the ilium, on the other, especially when the mucous surface is the tissue primarily attacked.

43. *A.* ACUTE ILEO-COLITIS. — *a. The symptoms* vary according to the portion of intestine chiefly affected; but the most *characteristic* of the more *acute states* are — pain, aching, or soreness, with frequent gripings, in the right iliac region, and between this part and the umbilicus, often extending across the hypogastrium, and occasionally above and around the navel; tenderness on firm pressure of these places; diarrhœa, the stools being thin, mucous, or watery; and symptomatic fever. At the commencement of the slighter cases, there may be neither chills nor rigors; or they may be slight, or they may recur and alternate with febrile heat; but they generally usher in the more acute attacks. As the disease is developed in its *acute form*, the patient complains of a sense of heat in the above situations, particularly in the region of the ileo-cæcal valve; and of flatulent distension, pressure frequently causing a gurgling sound in this region. The abdomen is hot, dry, and more and more painful, distended, and tender on pressure as the inflammation proceeds. The stools become more disordered, darker, more offensive, mucous, or watery, and occasionally streaked with blood, or contain imperfectly digested substances. The complaint, when judiciously treated, will generally not proceed further, all the symptoms gradually subsiding; but when it is neglected, and when it is complicated with disease of the liver or other organs, or associated with remittent or adynamic forms of fever, or when it extends to the rectum, thereby giving rise to a most severe and dangerous form of *dysentery* (§ 17.), the inflammatory action very often proceeds to disorganisation, the peritoneum ultimately becomes implicated, and the several lesions described in the article just referred to (§ 59. *et seq.*), and in that on the pathology of the DIGESTIVE CANAL (§ 34. *et seq.*), supervene and terminate life.

44. *b. Inflammation of both the small and large intestines* seldom extends in temperate climates to all the coats or tissues of all these viscera in the same case. When inflammatory action attacks or extends to all the coats or even to the peritoneal coat, portions only of either the small or large bowels are thus implicated, — more rarely of both. Yet I have frequently observed, particularly in warm climates, all the coats — the mucous and peritoneal inclusive — inflamed both in the ileum and in the colon, including the cæcum and even the rectum. In these cases, the disease commenced either as inflammatory diarrhœa, or as inflammatory dysentery, the morbid action existing in the mucous surface of the ileum and colon in the former and in the rectum also in the latter, — ultimately extending to all the tunics, in portions of these intestines, and giving rise to partial or general peritonitis and to the other consequences of enteritis already noticed, with the symptoms attending them, in their most severe and most prominently marked forms or in the form about to be described. When the inflammation proceeds thus far, the chances of recovery are very few; the change of structure already produced on the internal surface of the intestines combining with the intensity of the morbid action, and with its consequences, in the external coats, in destroying the patient. In these, the symptoms vary much in different cases, according to the part chiefly affected, and the other circumstances connected with the production and course of the disease; but either a combination of the local symptoms characterising both *sero-enteritis* (§ 30.), and *sero-colitis* (§ 39.), or a predominance of the symptoms of either, with great febrile commotion — with heat of surface, particularly of the abdomen, very quick, sharp, constricted, hard and small pulse; dry tongue, thirst, occasionally vomiting; scanty, high-coloured urine; and ultimately physical exhaustion, singultus, or flatulent eructations, cold extremities, &c. When the morbid action thus invades the external coats of the bowels, the diarrhœa subsides, and constipation often takes place, the seat of pain and of tenderness generally indicating the portion of the bowels chiefly affected.

45. *B.* ILEO-COLITIS OF WARM AND INTER-TROPICAL COUNTRIES. — *a.* Inflammation of the small and large intestines is of frequent occurrence *amongst Europeans residing in inter-tropical countries*, and indeed amongst the inhabitants of all hot climates. It generally commences in the villous coat, but it occasionally attacks all the intestinal tissues almost simultaneously, or the peritoneal coat chiefly, particularly when it is caused by exposure to cold in any way, or by sudden suppression of the perspiration. When it originates in the villous surface, it is often owing to, or at least connected with, a morbid condition of the biliary and other secretions poured into the intestinal canal; the alvine evacuations being more or less disordered. It rarely commences in the peritoneal coat, unless consecutively upon inflammation of the liver, with which it is often *complicated*, especially in India. At first, the bowels are seldom obstinately constipated, but they are sometimes costive. They are oftener, however, laxer than usual — and diarrhœa is present in many cases. Indeed, the disease often commences in the form of inflammatory diarrhœa, or of dysentery, and continues in either of these, particularly the former, as long as the villous coat

and follicles only are affected. The *stools* are morbid, of various colours, and frequently change their appearance. They are offensive, often dark-coloured, watery, or serous — sometimes pale, fluid, and frothy, resembling fermenting yeast; at other times, they are slimy-green, gelatinous, or mucous. As the disease advances, they are of a dark green, with lighter shades, or with brown or yellowish-brown streaks, and at last they become very dark and grumous, occasionally bloody, especially when the colon is much affected.

46. *b.* As the inflammation extends to the other coats, the griping pains, which manifestly, from the morbid appearances of the motions, arise from, or are increased by, the irritation of disordered secretions, are attended by more continued suffering, and by a sense of internal heat, or burning, with great soreness and tenderness of the abdomen upon pressure. The diarrhœa subsides, and the stools become scanty; and attempts at evacuation are accompanied with violent exacerbations of pain. The tongue is white, excited, red at its point and edges, and afterwards very loaded at its middle and base. The strength, especially of the lower limbs, is remarkably prostrated. The pulse is quick, soft, and small. Vomiting occasionally occurs, particularly after cold fluids taken to quench the urgent thirst. The abdomen is generally hot, tense, and tender. As the disease advances through the parietes of the bowels, the above symptoms increase. The stools, which were previously, and whilst the internal surface of the intestines were chiefly affected, of a watery, serous, mucous character, sometimes streaked with blood, now become more scanty and morbid; the abdomen more tumid, painful, and tender, and vomiting more frequent and distressing.

47. *c.* When the inflammation commences in what has been called the phlegmonoid form, seizing at once upon the different coats of the bowels, the symptoms are much more acute and violent from the first. The patient complains consecutively upon, or coëtaneously with, cold chills or rigors, of sharp pains around the umbilicus, in the right iliac region, or between these regions, and extending down to the hypogastrium. The pulse is hard, quick, and constricted, or small. The tongue is loaded, clammy, and dry. The bowels are irregular or constipated, and inefficiently acted upon by cathartics, until depletions have been freely practised. When the disease commences in this form, its progress is very rapid. The face soon becomes anxious; the stomach irritable, and the vomitings frequent; the tongue deeply coated, dry, and brown; the abdomen very tense, tumid, and tender; the skin, particularly over the trunk, very hot, harsh, and dry; the calls to stool most distressing, and unsatisfactory; the urine very scanty and high-coloured; and the respiration suppressed and chiefly intercostal. If the disease is not now arrested, all these symptoms increase in violence. The features are sharp and anxious; the patient lies on his back with his knees drawn up: the hands and feet are cold and clammy; whilst the abdomen is hot: the pulse is small and weak; the breathing laboured, hurried, and irregular, sometimes difficult or attended by hiccup. The pain and tenderness are often more diffused over the abdomen, extending to the hypochondria and hypogastrium — and the distension is augmented. At last, exhaustion, cold sweats, faintness, hurried respiration, singultus, with increased action of the *alæ nasi*, collapse of the features; a weak, small, thready pulse, extreme restlessness, and death, supervene.

48. *C.* Sub-Acute and Chronic Ileo-Colitis. — *a.* The *sub-acute* and *chronic states* of ileo-colitis, particularly in the slighter cases, differ in nothing from the *serous* and *mucous varieties* of Diarrhœa (§§ 9—12). — I have shown, in that article, that these varieties of diarrhœa, although generally commencing in irritation, usually depend, especially in *children*, upon inflammatory action, seated chiefly in the mucous surface and follicles of the ileum, cæcum, and colon; and that these, as well as some other forms of diarrhœa (§§ 13—18.), particularly when severe, of long duration, or attended by fever, pain, or tenderness, in the situations stated above (§ 43.), always present the usual consequences of inflammation of these parts, upon examinations after death. The *symptoms*, therefore, of sub-acute and chronic ileo-colitis are identical with those described as attendant upon the inflammatory states of Diarrhœa.

49. *b.* The more *chronic states* of ileo-colitis are most frequently *associated* with visceral disease of a chronic and sometimes obscure kind. They most commonly attend *tubercular consumption*, and in this case the mucous follicles and the solitary intestinal glands are chiefly affected, and contain, in the early stage, tubercular-like matter. Chronic disease of the liver and enlargement of the mesenteric glands are also frequent complications, the former generally preceding, the latter supervening upon, the intestinal affection. The acute and sub-acute forms of ileo-colitis are often associated with inflammation of the substance of the liver, and with certain endemic and epidemic fevers, of which, however, they are usually consecutive. Chronic ileo-colitis is seldom a simple disease; but, in its different complications, the affections which precede or occasion it, as well as those to which it gives rise, should be ascertained, before the intentions of cure be resolved upon. When the disease affects the rectum and sigmoid flexure of the colon, the desire to go to stool is almost constant, and the straining often urgent. In this case, the complaint becomes identified with *chronic* Dysentery.

50. *c. The symptoms* of chronic ileo-colitis differ but little from those of chronic diarrhœa. When the colon is but slightly affected, the stools may not be very frequent; but if it be the chief seat of the disease there will be more or less diarrhœa, the evacuations being yellowish, greenish, or clayey, or even muco-puriform in a more advanced stage, or when ulceration has taken place. Uneasiness and soreness are usually felt in the abdomen, and sometimes pain, at one place acute, at another dull, or fixed or moveable. These sensations are exasperated some time after a meal, also by moral emotions, by violent exercise, or by the motions of a carriage. The tongue is often not materially affected; it is sometimes pale. The appetite, particularly when the disease is symptomatic of tubercular consumption, is often not materially impaired. At an advanced stage, the abdomen is usually large and tympanitic, contrasting remarkably with the emaciated extremities, especially in *children*. In this class of patients, mesenteric disease supervenes on the

intestinal affection, and *marasmus* is produced. In some cases, however, especially in adults, the abdomen is either not swollen, or is even more than usually sunk. A short dry cough frequently attends the latter periods of the disease.—The *duration* of chronic ileo-colitis is indeterminate. It is often recurrent, intermittent, or remittent, presenting longer or shorter periods of remission, or of immunity from disorder, especially in its slighter states and earlier stages. But it generally recurs upon slight errors of diet or regimen, or after exposures to cold or humidity.

51. *D.* PSEUDO-MEMBRANOUS ENTERITIS — *Enterite pseudo-membraneuse*, CRUVEILHIER.—*a.* This form of enteritis was first described by Dr. POWELL. (*Med. Trans. of Col. of Physic.*, vol. vi. p. 106.) It has more recently been observed by CRUVEILHIER, ANDRAL, GENDRIN, GUIBERT, BRETONNEAU, and myself. It rarely appears in an *acute*, but generally in a *sub-acute* and *chronic* form—the latter especially; or, in other words, acute inflammation of the villous surface of the bowels is rarely attended by the formation of a false membrane on its surface to any extent, although portions of coagulated lymph of considerable size are occasionally passed along with the other matters evacuated in the advanced course of the disease. Pseudo-membranous enteritis is most frequently *chronic* and *intermittent*, or rather, it may be said to depend upon a latent and prolonged state of inflammation, extending along a very large portion, sometimes the greater part, of the intestinal canal, as evinced by the quantity thrown off; the most prominent symptoms subsiding for a considerable time and re-appearing afterwards, and continuing with more or less severity until the false membrane produced by it is detached and discharged. I have met with two cases of this disease in its most severe forms, and several instances in a much slighter degree. Both the former, and most of the latter, occurred in females, in which sex all the cases observed by Dr. POWELL also occurred.

52. *b.* The *symptoms* are often very slight, and consist chiefly of a sense of soreness, slight heat, and tenderness on firm pressure of the abdomen. The bowels are generally irregular—either too relaxed or too costive, and rarely natural, as respects either the times of evacuation or the state of the motions. After considerable intervals, sometimes of several weeks or even longer, colicky and violent abdominal pains are experienced, and the stools afterwards passed contain shreds of false membrane of various sizes, occasionally formed into complete tubes of considerable length. These formations are occasionally white and soft, and sometimes yellowish, consistent, and even elastic. From their appearances as well as from the symptoms preceding their discharge, there is reason to infer, that they may be produced in any part of the intestinal canal, or in both the small and large bowels at the same time. Whilst the symptoms are often so slight as hardly to occasion any inconvenience, they are sometimes much more severe in respect both of the intervals and of the painful attacks preceding the evacuation of these morbid productions. In these, the symptoms of *chronic muco-enteritis*, or of *chronic ilio-colitis*, are generally present. Heat, soreness, aching or dull or acute colicky pains are felt at intervals; but these pains are seldom increased by pressure, although soreness and aching are usually aggravated by it. After slighter or severer local symptoms of this kind being occasionally felt, for some weeks or even longer, and augmented by any error in diet, or departure from an abstemious regimen, a more violent attack occurs, and resembles either severe colic, or the symptoms attending the passage of biliary calculi into the duodenum. The bowels then generally become more lax, and the stools contain portions of false membrane, which continue to be voided for two, three, or four days, three or four evacuations often taking place daily. Occasionally the bowels do not act spontaneously, the discharge of these membranes being assisted by medicine. The severe symptoms afterwards subside, until the morbid formation is again developed, and begins to be detached. The pulse is sometimes not affected, but it is often somewhat accelerated. The tongue is usually covered by a whitish or yellowish-white mucus or coating, and is seldom red at its point or edges. The appetite is impaired; there is thirst, and much flatulence of the stomach and bowels; but the temperature of the surface, the state of the skin, and the urine, are not materially affected. During the severity of the paroxysm, vomiting frequently takes place: and Dr. POWELL observed jaundice precede it, probably owing to an inflamed state of the villous coat of the duodenum having prevented the discharge of bile into the intestines, or to the false membrane extending over, or into, the common duct.

53. Dr. POWELL states that in all the cases he observed, there was indigestion, with frequent recurrence of pain, — that the more violent seizures consisted in sudden and excessive pain, frequently increasing in paroxysms, and rather relieved by pressure, but leaving great soreness and tenderness during the intervals, — and that this state continued under four days, the stomach during it being very irritable, and the tongue clammy and coated. This physician justly considered the false membranes* thus discharged to have been formed in a similar manner to those observed in croup; and, in a few instances, in bronchitis. (This subject is further noticed in the article DIGESTIVE CANAL, §§ 46. 48.)

54. IV. ASSOCIATIONS OR COMPLICATIONS.—Several of these have already been noticed. The *follicular variety* of muco-enteritis is often associated with *adynamic* or *typhoid fevers*, or rather it occurs as a frequent complication of these fevers, especially in certain localities, epidemics, and circumstances, to which sufficient allusion has already been made (§ 17.). Its complication with *tubercular consumption*, also as a consequence of that malady, has like-

---

* A lady, who came from Yorkshire to be under my care, and remained several months in London, was the subject of this complaint, associated with *Hysteria* in its most severe and complicated form, and occasionally amounting to catalepsy. She experienced a recurrence of the more painful seizures every four, five, or six weeks, followed or attended by the discharge of the false membranes, in large quantity, and sometimes in the form of perfect tubes. The catamenia were always most painful, somewhat irregular, attended by vomitings and severe abdominal pains, yet abundant; but they were also accompanied with the discharge of shreds or false membrane from the uterus. The discharge of the membranes from the bowels and vagina was not, however, contemporaneous, although sometimes nearly so. The nature and the severity, the rare complication, and the persistence of the disease, led to consultations, other physicians thus also witnessing this almost singular case.

wise been stated (§ 17.). With disease of the *mesenteric glands* it is likewise very often associated; but, in this complication, it is generally the primary affection. *Muco-enteritis* is very commonly connected with *disorder of the biliary functions* and with *disease of the liver*, particularly in India and warm climates. Either affection may be consequent on the other, but most frequently enteritis is the secondary disease. When matter is formed in the substance of the liver, *follicular enteritis*, with diarrhœa, or a chronic form of dysentery, is produced; but not so much by the acrid or otherwise disordered bile discharged into the intestines as by a morbid state of the blood, caused by the absorption of a portion of the matter from the liver. The blood thus contaminated induces disease of the intestinal follicles, and particularly of Peyer's glands. It is only when the surface of the liver is inflamed that the disease sometimes extends to the peritoneal surface of either the small or the large intestines, inducing *sero-enteritis*, or *sero-ileo-colitis*, the *omentum* and even the *mesentery* being sometimes also implicated. It is, however, not improbable that disease of the follicles, particularly if ulceration have taken place, will occasionally be followed by the passage of morbid secretions into the portal circulation, inflammation of the portal veins, and abscesses of the liver being thereby occasioned. *Jaundice* is also sometimes complicated with muco-enteritis, and may arise either from disease of the liver or ducts, or from extension of the inflammation to the common duct, or the occlusion of its opening into the duodenum, owing to turgescence of the surrounding tissue.

55. Inflammation of the internal surface of the small intestines sometimes extends from the duodenum to the *stomach*, and *gastritis* as respects the villous coat, being complicated with *muco-enteritis*. In some instances, the disease proceeds in an opposite direction, and in others, both the stomach and intestines are nearly coëtaneously affected; this latter occurrence being very frequent in fevers. Indeed, inflammation of the villous coat of both the stomach and intestines constitute one of the most common and important complications in *remittent*, *malignant*, and *exanthematous fevers*; but this part of my subject is fully discussed in the article Gastro-enteric Disease (§ 10. *et seq.*). The various forms of enteritis, but especially muco-enteritis, very frequently appear as complications in the course of *scarlatina*, *small-pox*, and *measles*, although often in slight or latent states, or more or less masked by the other phenomena of these maladies. In *scarlatina*, gastro-enteric inflammation is a part of the morbid conditions invariably present in some grade or other, or, in other words, inflammatory injection of the villous surface of the stomach and intestines is as constantly present as the same condition of the *vascular rete* of the skin, and most probably at a still earlier period of the disease, and to a much greater extent, when the eruption either is imperfectly developed on the surface, or disappears from it prematurely. This indeed is demonstrated by the symptoms in all cases, wherein they are carefully observed. The affection of the intestinal mucous surface, more especially in those cases just alluded to, is evinced by pain, tenderness, tension, and fulness of the abdomen, and by nausea, vomiting, or diarrhœa; the stools being serous, dark-coloured, and containing flakes of lymph of a much lighter colour. In the complication of scarlatina with enteritis, the villous coat itself is the part chiefly affected; whilst in that of *small-pox* with enteritis, the mucous follicles are often implicated. In the advanced stages, however, of these maladies, sero-enteritis occasionally supervenes, either alone, or in connection with peritonitis.

56. Enteritis may also occur as a complication of the advanced stages of *measles*, more especially upon the premature, or the regular decline of the eruption; but it is generally slight in degree, and rarely the cause of an unfavourable termination of that disease, unless when associated with general *bronchitis*, or with *pneumonia*. In some of such cases, the inflammation has been found affecting the villous surface of the intestines to a considerable extent, the mucous follicles and the mesenteric glands being enlarged or inflamed. There are other contingent complications of enteritis, as those with *splenitis*, with *peritonitis*, &c.; but they require no particular notice at this place, having been noticed under those heads.

57. In *children*, the different forms of enteritis appear more frequently associated with other diseases than in uncomplicated states; for they seldom continue long in those latter states without super-inducing other disorders. In many instances the complication is either accidental or contingent; in others, it depends upon the nature of the predisposing and exciting causes, whilst in some, the associated diseases arise as consequences of the primary affection of the intestinal canal. Sufficient allusion has already been made to these complications: the most important are, infantile remittent fevers, cerebral congestions, &c. bronchial affections, tubercles, disease of the mesenteric glands, &c. It is not unusual to observe, particularly in some seasons, a form of fever very prevalent, or even epidemic among children, in which both the *digestive* and the *respiratory mucous surfaces* are affected by a catarrhal form of inflammation, and in which the state of irritation seems to predominate in these surfaces above that of true inflammatory action. In many of these cases, it is difficult to determine whether the digestive canal, or the respiratory organs, are first affected; either may experience a priority, or predominance, of disorder; and the one may become free from disease as the other is more severely affected. These circumstances are of great importance in the management of this complication, which is extremely frequent in infants and children in London, particularly in the poorer classes and in children insufficiently or improperly nourished and clothed.

58. V. Diagnosis. Little need be added on this subject; as much has already been stated in reference to it; and, as both in pathological and in therapeutical points of view, it is as necessary to point relations, approximations, or alliances, between diseases, as to assign distinctions between them, that exist only in the more extremely removed cases, and that cannot be detected in the majority of instances, or only partially, and in their slighter or finer shades. Writers, who had little knowledge of disease from close personal observation, have been in the habit of stating certain distinctions between allied affections of the digestive canal as if they were describing different genera, or distinct substances, in natural history, or certain

unvarying entities, or algebraic quantities; and hence misleading, more frequently than instructing, the inexperienced. The disorders which they have thus endeavoured to distinguish from the different varieties of enteritis, or rather from *enteritis* simply, as they have known but little of its various forms and associations — are *colic*, *ileus*, *gastritis*, *peritonitis*, *constipation*, *diarrhœa*, *cholera*, and *dysentery*; and it must be obvious to the scientific and rational practitioner, that it is quite as important for him to trace the connections between diseases, and the transitions of the one into the other, as to recognise differences, which are often more apparent than real, and which should be estimated as they truly exist — as modifications rather than differences — as indications of something in common, but as something also peculiar or proper to each, which it is necessary thus to establish.

59. *A*. There are certain circumstances connected with the *seats* of enteritis, to which some reference may be made, as being not without importance in practice; and these may be comprised in an answer to the following question: — *How far may the symptoms enable us to conclude as to what portion of the intestinal canal is chiefly or solely affected?* Before any conclusion should be arrived at, the exact seat of pain, the part in which it commenced, the seat of tenderness or distension; the state of the stomach and bowels, and the periods after taking food when vomiting or purging occur; the sounds and sensations caused by percussion; the appearance of the evacuations; and the nature of the exciting causes, should be duly considered.—*a*. The *seat* of pain at the commencement of the attack is always deserving of attention, as indicating, although not always correctly, the part affected. If the disease begin in the region of the *duodenum*, or if this part become consecutively affected, irritability of the stomach a very short time after food is taken, and either increased or interrupted discharge of the bile, are more likely to occur; and the calls to stool are not nearly so frequent as when the lower portions of the bowels are inflamed. (See Duodenum, § 7. *et seq.*) When pain, tenderness, and fulness, commence around the navel, or between it and the right ilium, inflammation of the ilium may be suspected; and if there be diarrhœa, and pain in the region of the *cæcum*, the pains assuming a colicky or griping character, and extending in the course of the *colon*, the extension of the disease to these viscera may be inferred, especially if tenderness exist in these situations, if there be little or no vomiting, and if the symptoms be exasperated two or three hours after a meal. When inflammation of the villous surface of the colon is subacute or chronic, even although it implicate the lower part of the ilium, or when *chronic ilio-colitis* is present, the functions of the stomach are often but little affected, unless the attendant diarrhœa is suddenly arrested, or constipation occur. It is chiefly at the commencement, or during the early stages of inflammation, that it is limited to one portion of intestine, or to a single tissue. The rapidity of extension of the disease to adjoining parts is generally great in proportion to the depression of vital power, the state of this power in connection with that of the blood giving rise to the particular form or character of the inflammation, and of its consequences or products.

60. *b*. A *serous* state of the *stools*, particularly if albuminous flocculi, or pieces of lymph, be contained in them, show that the villous membrane is chiefly affected; whilst a *mucous*, or *muco-puriform* condition of them indicates disease of the follicular glands: a combination of these two states suggests the probable association of these affections. The presence of digested *fæcal matters* in the stools, duly coloured with bile, evinces the performance of the functions of the upper portions of the alimentary canal; but when the food is imperfectly changed, impairment of these functions, and great irritability of the muscular coat, owing to general and local debility, and disease of the mucous surface, may be inferred; the inflammatory irritation generally extending, in such cases, to both the small and large intestines. If the stools are devoid of their peculiar or usual *odour*, the large bowels are probably affected. If they contain small but numerous streaks of *blood*, or if the blood be mixed in small quantity with the other matters, a severe form of muco-enteritis is generally present. If the blood be passed in larger quantities, if it be mixed with the other evacuated matters, or if it be grumous, or muco-puriform matter be also observed, ulceration consequent upon follicular enteritis is usually found. If it be voided quite pure, in large quantity, and but little mixed with the rest of the motion, it commonly proceeds from the large bowels.

61. *c*. *Percussion* should seldom be omitted in endeavouring to ascertain the seat of enteritis. It can rarely be *endured* when, or in situations where, the inflammation has advanced to the serous coat. It assists in indicating the parts most distended by flatus, or obstructed by fæcal accumulations, by internal strangulation, or by adhesions, or thickening, &c. of the coats of the bowel. As long as the disease is confined to the inner surface, it seldom causes much pain at the time, although soreness or aching is usually increased by it afterwards.

62. *d*. Amongst other circumstances contributing to a correct diagnosis of the several forms and complications of enteritis, the nature of the causes, the constitution and the previous health of the patient, are not the least material; particularly as respects the character of the attendant fever, and of the local affection. If these causes are of a septic, contaminating, or depressing kind, such as already enumerated (§ 18.), the mucous follicles will be especially affected, and the fever will present the adynamic state. If the powers of life have been previously sunk, or if the circulating fluids have become morbid or contaminated, or if there have been manifest cachexia conjoined with great debility, the local and the constitutional affections will be such as just stated; and both the small and the large bowels will be similarly and almost coëtaneously affected. When inflammation in these cases advances to the serous surface, particularly after perforation of the coats, it extends rapidly over this surface, and gives rise to a more or less copious fluid effusion, the state of local as well as of constitutional action being, in such circumstances, rarely capable of producing coagulable lymph, as shown in the article Inflammation (§ 58).

63. *B*. If it be necessary to ascertain the parts of the intestines which are the seats of inflammation, it is still more requisite *to determine whether or not*

inflammation is really present. This, however, is not always so easy as many have believed; for inflammatory action may exist in the digestive canal so as to give rise to many of its most dangerous results, without those symptoms, by which inflammation has generally been supposed to be indicated, having been observed. Several of these disorders, usually viewed as functional merely, and which undoubtedly are *such* in many, or even in the majority of cases, often proceed from inflammatory action in a portion of the villous surface, that either extends itself in a gradual or rapid manner, or becomes resolved when the causes have ceased to act, or when the secretions from the part have had the effect of removing the irritation or of unloading the congested and inflamed vessels. Many cases which have been viewed, from the character of the prominent symptoms, as flatulence, or constipation, or colic, or diarrhœa, have actually been some form or other of enteritis, or inflammatory states, in which certain portions of the intestines, or of the tissues composing their parietes, have been affected in a different manner, or in a modified form or degree.

64. *a. Flatulence, constipation,* and *colic,* are chiefly functional disorders of the digestive canal; but they often depend upon inflammatory irritation of some portion of it, and are apt insensibly to pass into inflammation. They, moreover, both severally and conjointly, accompany, as prominent and important symptoms, the most severe and dangerous forms of enteritis. Hence the necessity of determining their sources, and their connections with, or their independence of, inflammatory action. If the least tenderness or soreness on percussion, or on firm pressure of the abdomen, be felt or indicated, — if this examination soon afterwards occasion soreness, pain, or uneasiness internally, although neither may have been complained of at the time of making it, — if the pulse be hard, constricted, or full, or accelerated, — if the abdomen become tumid, or tense, dry, hot, or harsh, — if the tongue be white, the papillæ erect, and its point or edges red, — and more especially if nausea or vomiting occur — the connection of either of these affections with, or their dependence upon, incipient or developed inflammation, should be inferred, and a strictly antiphlogistic treatment prescribed. I have met with instances where enteritis had been treated as simple constipation with colicky pains, and where the slightness of the above symptoms, or the presence of only one or two of them, had deceived the inexperienced practitioner into the exhibition of acrid and heating purgatives, which had aggravated the disease, until it had proceeded too far to be arrested by the most judicious means, fatal symptoms suddenly appearing, and the patient sinking before the mischief was anticipated.

65. *b. Ileus,* like the preceding affections, may, or may not, be associated with, or be entirely owing to, inflammation. It is shown in the article on *Colic* and *Ileus* (§ 37—45.), that these affections are often thus related, the latter particularly; and that, even when depending upon the pathological states there enumerated, inflammation is very often either an associated or a superinduced lesion, generally implicating all the coats of a portion of intestine, or the serous coat more especially. In many of these cases, either some internal constriction, or strangulated hernia, or an intus-susception, is the cause of suffering; but in these, as well as in those originating differently, inflammation soon supervenes, although it is not always announced by rigors or consequent reaction, or even by the general character of the symptoms. Indeed the sufferings of the patient are frequently so great, and the vital power is so exhausted by the nature or extent of the lesion — the shock sustained by the constitution is such — as to prevent the developement of the phenomena of general vascular reaction, and to extinguish life, before the local chances characteristic of inflammation had proceeded far; or before symptomatic fever had supervened. These attacks, and particularly those varieties of colic usually denominated the *Lead,* and the *Madrid colic* (§§ 16. 25.), have been viewed as forms of *enteralgia* merely, or of *neuralgia* of the intestines, and described as such by several Continental writers. That the sensibility of the nerves of the intestines is morbidly excited or affected will be admitted; but that these diseases consist only of altered sensibility cannot be conceded. This is a part merely of the pathological states constituting these maladies; impaired and disordered secretion and excretion — a morbid condition of all the secretions poured into the intestinal canal, and diseased action of the muscular coats of the bowels, equally form a part, and often the most important and efficient part, of them, various other associated functional derangements being also present.

66. *c. Diarrhœa, Cholera,* and *Dysentery,* may be associated with intestinal inflammation, or may pass into it; and, equally with the foregoing disorders, require to be carefully distinguished in their simple and in their symptomatic or complicated states. — *a. Diarrhœa,* particularly its *serous* and *mucous* forms, has been already shown to be one of the earliest indications of enteritis, particularly when the mucous coat and follicles of the small and large intestines are the tissues affected. But the slighter and more evanescent states of diarrhœa are generally independent of inflammation, and proceed chiefly from irritation and increased exhalation and secretion, caused either by the nature of the ingesta, or by checked cutaneous and pulmonary transpiration, or by the state of the secretions poured into the digestive canal; the irritation and increased secretion, however, often passing into inflammatory action, whenever a predisposition to it is present. As soon as this change takes place, the states of the stools, of the abdomen, of the skin, of the pulse, and of the tongue, as described above (§ 7. *et seq.*), will generally indicate it to the careful observer.

67. *β.* The same observations apply to *Cholera,* which also may pass into enteritis; but it should be recollected that when muco-enteritis in an intense form is seated chiefly in the duodenum and jejunum, that the symptoms may nearly approach those of cholera; vomiting, diarrhœa, and sympathetic spasms of the muscles of the extremities, being often as severe in this state and seat of enteritis as in that disease. It has already been shown that bilious *cholera* (§ 25.) sometimes passes into enteritis; the irritation of morbid or acrid bile exciting inflammatory action in the mucous surface, that either subsides without proceeding further than this surface, or extends to the external coats when the inflammatory disposition is considerable. In either case, particularly in the latter, the physician will be guided by the

symptoms evinced by the parts and in the manner already named (§ 59.) in forming his diagnosis.

68. *γ*. In *Dysentery*, more or less of inflammatory action of the mucous surface and follicular glands of the large intestines is generally present, especially in the sthenic forms, and in the developed states of the disease. Still the inflammation is often a superinduced and an associated, rather than a primary, morbid condition in this malady, the abdominal secretions and excretions being the first disordered. These secretions irritate the mucous surface and its follicular apparatus, and induce inordinate or spasmodic action of the muscular coats of the bowel, and particularly of the rectum and sphincter ani, causing the retention of the more hardened portions of fæces, which further augments the irritation, until inflammation, with its various consequences, is produced. In such cases, it is not merely the existence and the exact seat of inflammation that should be ascertained, and which the description already given will generally indicate, but the characters of the local action and of the constitutional affection ought also to be closely observed and correctly estimated.

69. *d*. When inflammation extends to the serous coat of the intestines, it becomes identified with *peritonitis;* and whether it be limited to a small portion of this coat, or extend more or less generally, it is in all respects an intestinal peritonitis, of the diagnosis of which sufficient notice is taken under that head (see Peritoneum), to which, and to the article Stomach, where enteritis is distinguished from *gastritis*, the reader is referred for farther remarks on the diagnosis of these very intimately related maladies.

70. *e*. As the *complications* of enteritis are so important, it becomes requisite that the diagnosis of them, and even the successions of their appearance, should not be overlooked. This is still more important in warm climates, where enteritis is very often a complicated malady. When functional and organic *diseases of the liver* are attended by a morbid secretion of bile, or when this fluid has become acrid, enteritis is very commonly induced in one or other of its forms, and is then rarely limited to the small intestines, the colon and rectum being often implicated, and hepatic dysentery developed. But chronic enteritis, or ileo-colitis may *occasion*, as already shown (§ 49.), disease of the liver, particularly of its internal structure, either with or without purulent formations in it. In this case, increased frequency of vomiting, tenderness and fulness in the right hypochondrium and epigastrium, chills, rigors, and jaundice, may supervene, and indicate the nature of the complication, or they may be almost or entirely absent. In warm climates, enteritis, hepatitis, and dysentery, are often associated, and without sufficient proof being furnished of their course of succession. In the eastern hemisphere, however, the disease of the liver is most frequently the primary affection, although it sometimes is induced by either, or by both, of the other maladies. Of the complication with gastritis, it is unnecessary to add more, than that its existence should always be expected when enteritis is occasioned by stimulating, acrid, or poisonous ingesta, or by an excessive quantity of rich and heating food or drink. In these cases, the frequency of the vomiting, the recurrence of it instantly after substances are taken into the stomach, the constant or frequent eructations of flatus, the epigastric tenderness, soreness, pain and fulness, in addition to the symptoms of enteritis, will indicate the morbid association. When this complication arises from the nature or the quantity of the ingesta, the affection of the stomach sometimes subsides as that of the small or large bowels increases, and thus gastro-enteritis may pass into muco-enteritis, and thence into ilio-colitis or dysentery. This succession is not infrequent in warm climates, or in temperate climates in summer and autumn, and particularly in those who have partaken of unwholesome food, or who have exceeded in the use of spirituous or fermented liquors. Enteritis in connection with *gout*, or in the gouty diathesis, and especially upon the disappearance of gout from the extremities, is not uncommon, and is always sudden and severe in its occurrence; but further allusion will be made to it hereafter.

71. VI. Terminations or Consequences and Prognosis. — *A*. A *favourable termination* of enteritis is indicated by a diminished severity of the more prominent symptoms, by the decrease of fever, by a more natural state of the evacuations as to their appearance and their frequency, by a more copious discharge of urine, by a more clean, moist, and natural state of the tongue, by a less frequent pulse, and by a diminution of the tenderness, soreness, fulness, tension, and heat of the abdomen, the general surface becoming more moist and natural.

72. *B*. The *unfavourable consequences* or *terminations* of inflammation of the bowels are — 1st. Ulceration, with its consequences, intestinal hæmorrhage, or perforation of the intestines; — 2d. Various organic lesions of the coats of the intestines and of the mesenteric glands; — 3d. Peritonitis in some one or other of its forms; — 4th. Exhaustion of, or fatal shock to, the vital powers; and, 5th. Sphacelation of a portion of the intestinal tissues or parietes. — *a*. *Ulceration* of the intestines is not necessarily a fatal lesion, although it is so with few exceptions; for ulcers have been found cicatrized in this situation, the patient having died of some other disease which had occurred long subsequently to the intestinal affection. These *cicatrices* very rarely present any regeneration of the villous tissue, although this has been observed by M. Andral. Their bottoms consist of a cellulo-serous tissue, of a greyish white, without either villi or follicular glands, gradually assuming the appearance of the surrounding mucous coat, and possessing considerable firmness and tenacity. *Ulceration* of the intestines — which is fully described in all its forms in the article Digestive Canal (§§ 36—40.), — is not satisfactorily indicated by symptoms; although a combination of phenomena may lead to a just conclusion as to its presence. A muco-puriform or ochrey appearance of the stools, an increased frequency of them, the presence of large quantities of blood in them, and symptomatic fever assuming an adynamic, or chronic remittent, or hectic form, are the surest indications of ulceration. The diarrhœa appearing in the course of tubercular disease, is generally dependent upon, or connected with, disease of the follicular glands, and, at an advanced stage, with ulceration. Whenever muco-enteritis or follicular enteritis occurs in the course of a constitutional malady or

vice — of fever, of tubercles, or of general cachexia, the rapid supervention of ulceration may be anticipated.

73. *b. Various Organic lesions* of the parietes of the intestines, similar to those about to be noticed, or more fully described in the article Digestive Canal (§ 25. *et seq.*), and of the mesenteric glands, may be occasioned by enteritis, the patient continuing for months or years subsequently to evince disorder of the sensibility or functions of the bowels. These lesions, particularly dilatations, contractions, thickening of the coats, &c., according as they influence the calibre, or the secretions, or the contractility, or the organic sensibility of the intestines, occasion flatulence, constipation, colic, indigestion, retchings, emaciation, fæcal accumulations, hypochondriasis, and various nervous complaints, and, at last, either an attack of inflammation of the bowels, or of one of the associated viscera, or some other malady, carries off the patient.

74. *c. Peritonitis*, whether circumscribed or general, takes place in *two ways* — from ulceration, and from the extension of the inflammation to the serous coat without ulceration. It may arise from ulceration without perforation of this coat. In this case, the peritonitis is usually limited. If the ulcer have perforated all the coats, general peritonitis, caused by the effusion of a portion of the contents of the intestines, commonly results. Sometimes, however, perforation takes place without effusion occurring, owing to adhesions of the opposing serous surfaces having taken place before the coats of the intestine had been entirely penetrated. This consequence of enteritis is fully illustrated in the articles on the Peritoneum and Digestive Canal (§§ 40—43.), where numerous instances and references are adduced. The extension of the inflammation from the internal to the external surface of the bowel, whether it continue limited to a portion only of the latter, or extend more generally, is a frequent consequence of enteritis, which is indicated by the symptoms already enumerated (§ 31.), and by those more fully described when treating of inflammation of the Peritoneum.

75. *d. Exhaustion of*, or *the shock sustained by, the vital powers*, is more frequently a termination or consequence of enteritis, than sphacelation or gangrene. Many of the instances of death which have been attributed to this latter change have actually depended upon the former; but, when sphacelation of a portion of the intestine does take place, very nearly the same symptoms which indicate the one accompany the other. It is extremely probable, moreover, that in some of those cases where gangrene of a portion of intestine is detected after death, the gangrene had not existed at the moment of death, or had commenced either then, or soon afterwards; and that the symptoms were those of vital exhaustion or shock, leading not only to death, but also to sphacelation of the most inflamed part, death occurring first, and sphacelation soon afterwards, or both nearly contemporaneously; an opposite course, however, taking place in rarer cases. When the pulse becomes very rapid, small, weak, irregular or intermittent; when the breathing is hurried, laboured, irregular, and attended by increased action of the nostrils; when hiccup or regurgitation of the contents of the stomach without retchings occurs; when the patient complains of sinking, coldness of the general surface or of the extremities, or becomes restless; when the abdomen is tympanitic without increase of pain, or the skin is cold and clammy; and when the eyes are sunk, surrounded by a dark circle, and all the features sharp and collapsed, vital exhaustion, in connection with more or less of structural lesion, has then proceeded too far to admit of hopes of recovery.

76. *e.* Although *gangrene* oftener follows immediately upon, than precedes, dissolution, yet we sometimes have its existence antecedently to this issue sufficiently demonstrated. When the inflammation is caused by strangulation, and an operation is performed at a too late period, the portion of intestines thus circumstanced has been occasionally found in a sphacelated state, although more frequently it is a state of venous congestion, or a condition about to pass into sphacelation, rather than this latter state, that is observed. Moreover, in cases of enteritis caused by intus-susception, a considerable portion of intestine has been thrown off in a gangrenous state. Even portions of the villous coat of the bowel has been detached by effusion of fluids underneath it, whereby, its vascular connection being destroyed, sphacelation has taken place. In all such cases, the symptoms of vital exhaustion above enumerated (§ 75.) present themselves, and death ensues, with very few exceptions. These exceptions occur only when adhesions of the opposing surfaces had formed so as to admit of the detachment of the sphacelated portion, without effusion of the intestinal contents into the peritoneal cavity taking place. When gangrene precedes dissolution, then, in addition to the symptoms just noticed, extreme tympanitic distension of the abdomen, with diminution of the pain, or complete cessation of pain; faintness, breathlessness, syncope on raising the head, sinkings, cold-sweats, and coldness of the surface; constant hiccup, with flatulent eructations; unconscious or unrestrained evacuations, with a putrid or cadaverous odour; a small, weak, imperceptible or intermitting pulse; collapsed features, sunk eyes, and discoloured surface, indicate the disorganization, and soon terminate in death.

77. VII. Appearances after Death. — I must refer the reader to the articles on the Digestive Canal (§§ 18—43.), Diarrhœa (§§ 13—23.), and Dysentery (§§ 58—60.), for a detailed account of the structural changes consequent upon inflammations of the intestines, and merely state, at this place, those more generally observed. — When enteritis or entero-colitis supervenes upon inflammation of the stomach or liver — the disease of these organs occasioning death, and thus furnishing an occasion of observing the earlier changes connected with enteritis — the villous coat is then more vascular and florid than usual, and more turgescent, particularly the valvulæ conniventes; and in many places the mucous glands are more developed, and marked by a deeper tinge. The appearances are not uniform throughout the canal; but are most remarkable in the duodenum and upper portions of the ilium, when enteritis has been caused by a morbid state of the bile, or has been consequent upon gastritis. In these slight or incipient states, the inflammation is present only in broad patches or streaks, leaving the intermediate spaces of a nearly healthy state. The lowest portion of the ileum, the ileo-cæcal valve, and cæcum, are

oftenest found diseased, particularly in acute cases, and where enteritis or entero-colitis occurs as a complication of febrile diseases.

78. *a.* In the *acute forms* of enteritis, the villous coat is not only more vascular and turgid, but it is also softer, and sometimes thicker than natural. If the inflammation has proceeded far, it presents a brick-red tinge, and is easily detached from the subjacent coats, the connecting cellular tissue being soft, turgid, and inflamed. When this state exists in a considerable portion of the tube, the coats are apparently thickened, arising from the extension of the inflammation to the more external tissues, till the attached surface of the intestinal peritoneum is reached. The substance or parietes of the bowels may be considered as affected, in these cases, even although the external surface may present no further lesion than red vessels shooting into it. Occasionally, in addition to this state, the red capillaries in the inflamed peritoneal coat are connected with the effusion of coagulable lymph, particularly in those parts where they are most numerous, the lymph or albuminous exudation existing in specks, or in considerable spots or patches, on the serous surface. When, however, these latter appearances are remarked, the interior of the inflamed intestine frequently presents more serious changes than yet noticed. The villous surface is then deeply inflamed, and seems abraded or excoriated in parts. It is sometimes, in other parts, covered by patches of lymph, or of an albumino-puriform or muco-puriform fluid, or by a sero-sanious matter; and it is often also ecchymosed in numerous points or specks, or it presents still larger marks of sanguineous infiltration. In other cases, portions of a dark, slate-coloured, or sphacelated hue are observed, with or without ulcerated specks, or even large ulcers, which have nearly penetrated as far as the external coat, in adjoining parts. In rarer instances, one or more of these ulcers have made their way through the peritoneum, the contents of the bowel being partly discharged into the peritoneal cavity. Occasionally the ulcer has become attached at its margin to an opposite convolution of the intestines, the escape of fœcal matters into this cavity being thereby prevented. In a few cases, where the peritoneal surface has been coated with coagulable lymph, in the progress of the ulcerations through the membrane, the ulcers have been covered over by the lymph, so as to prevent the passage of the intestinal contents through the perforations. In addition to disease of the follicles, and to the consequences of such disease, particularly ulceration and perforation of the intestinal parietes (see DIGESTIVE CANAL, §§ 37. 40. *et seq.*), the villous surface, especially after the forms of enteritis observed in warm climates, is often excoriated or abraded in parts; and it is not infrequently sphacelated in large patches, particularly in the large bowels. These changes, however, as well as those consequent upon chronic enteritis, especially as respects the follicles and glands, are more fully described in the articles DIARRHŒA (§§ 12—22.), DIGESTIVE CANAL (§ 36.), DYSENTERY (§ 58.), and FEVER (§ 519.). I shall not therefore allude to them further at this place.

79. In the forms of enteritis in which the substance of the intestine, or its peritoneal coat, is chiefly affected, either primarily or consecutively, the whole of the coats are often very vascular, red or of a brick-red colour, and are readily torn. Coagulable lymph is effused on the serous surface, either in distinct clots, or as a general film, of greater or less thickness, and gluing the convolutions to each other, and to the adjoining viscera and surfaces. In these cases, the omentum has sometimes participated in the disease, being either more than usually vascular, or drawn up irregularly to the arch and flexures of the colon. When the examination is made within a few hours from death, as is usual in warm climates, the vascularity of the diseased parts is very great; and although the colour may be beginning to change, or the parts to assume a gangrenous appearance, yet complete gangrene of all the coats of the bowel is not often met with. It is, however, common to find the villous surface apparently sphacelated in places, and the external coat of the same part either of a bluish or brownish hue, but not altogether deprived of its cohesion, although more easily lacerated than usual. In these acute cases, the inflamed intestine is generally distended with flatus; but it is sometimes constricted, and the constricted portions are occasionally so small as to give the appearance of stricture by the application of a fine ligature. Intro-susceptions of portions of the ileum, which had taken place subsequently to the occurrence of inflammation, or even just before, or at the period of death, are met with in rare instances.

80. *b.* In *chronic cases*, as well as in the acute, the changes are chiefly observed either in the villous surface or in the follicles, or in both. Many of the lesions observed after the acute forms of the disease are also met with after the chronic states. In the latter, however, the villi are frequently of a blackish tint; and the isolated follicles and glands are oftener affected than the agminated glands, which latter are chiefly attacked in the acute. As respects the villous coat, the lesions consist of softening, thickening, and induration; with various changes of colour, from the lighter hues to a slate or deep-brown colour, and even to black. Whilst softening of the internal coats are most common in the acute, hardening of these parts is most frequent in the chronic, states of the disease. With the thickening of the villous and connecting cellular tissues there is sometimes a very remarkable contraction of the bowel; and many of the alterations described in the article DIGESTIVE CANAL (§§ 26—31. 52. *et seq.*). As respects the changes of the follicles and glands, I can add but little to what I have stated in this and the other places already referred to.

81. *c.* The *ulcerations* which take place in this form of the disease assume three different forms: — 1st, Those which commence in the agminated or PEYER's glands, and are seated longitudinally in the intestine: 2d, Those which originate in the isolated follicles and glands, and are of a rounded form: and 3d, Those which attack the villous surface, and present a transverse direction as respects the canal of the bowel. Either of these may go on to perforation and the production of acute or chronic peritonitis. Occasionally tubercular matter is detected at the margins of the ulcers. The mesenteric glands are often enlarged, inflamed, or congested, softened, and even suppurated.

82. *d.* I have had no opportunity of observing the appearances after death in the chronic cases where membranous or tubular exudations have been voided from the intestines, but such appearances

have been observed by several authors. Dr. MONRO states, that when the villous coat of the intestines is inflamed, the diameter of the part is much diminished by the effusion of coagulable lymph upon this coat; that the quantity of lymph is very various, sometimes being as thin as a wafer, at other times nearly filling the affected bowel; and that occasionally it forms only a thin lining to the villous coat, or appears in the form of tattered shreds,—in some cases filling the spaces between the valvulæ conniventes, in others covering these. In a case described by M. PAILLOUX, the villous coat was covered by a membranous layer extending uniformly over its surface. The follicles did not seem to have any share in the production of this membrane, which he considered as differing only by its continuity and thickness from the small isolated patches secreted by the villi in aphthous affections. According to the appearances observed by MM. BILLARD and LALUT, these tubular exudations and false membranes are produced from the villous surface itself, and not from the mucus secreted by the follicles, or from a diseased action of these follicles. These exudations have been observed in all parts of the alimentary canal.

83. *e.* In the *acute and chronic forms* of enteritis, inflammation of portions of the mesentery is sometimes observed, either with or without disease of the glands; and an œdematous state of this part is occasionally met with. Other changes are more rarely remarked both in the small and in the larger intestines; but they are merely incidental, and are described in the places above referred to. Various alterations are often also observed in the related viscera; but these are accidental complications which need not be adduced at this place.

84. VIII. CAUSES OF INFLAMMATIONS OF THE INTESTINES.—i. *Predisposing.*—The several varieties of enteritis occur at all ages, in all temperaments, and in both sexes; but they are most frequent in infants during the first dentition, and soon after weaning; and in the nervous, irritable, and sanguine temperaments. They are occasionally more prevalent in some families than in others, owing to peculiarity of constitution, and have hence assumed, in a few instances, somewhat of an hereditary character, especially in their slighter forms. Both sexes are nearly equally liable to them; males being, however, rather more frequently attacked than females, probably in consequence of their greater exposure to the exciting causes. The several forms of the disease may assume, from states of season and weather, or from the constitution of the air, a more or less *epidemic* prevalence. They are most common in warm and humid seasons, and when the vicissitudes of temperature are sudden and great: hence they are more frequent in autumn and summer than in other seasons, and when cold nights succeed to warm or hot days. They are also almost *endemic* in some countries, partly owing to the high range and high daily vicissitudes of the temperature, in connection with great humidity of the atmosphere; but partly, also, owing to the low and miasmatous state of the locality, or to the circumstances connected with the supply of water. Inflammations of the bowels of an asthenic form, often assuming the characters of dysentery, or chronic diarrhœa, or chronic ileo-colitis, or a true follicular enteritis, are very commonly caused, in hot climates, and even in numerous places without the tropics, by water preserved in tanks, or taken from marshes, or abounding with animal exuviæ or animalcules.

85. ii. *The exciting causes* of enteritis may be divided into — 1st, Those which operate directly on the digestive villous surface: 2d, Those which act indirectly, by arresting the secretions and excretions, and by determining the momentum of the circulation to the intestinal mucous membrane: 3d, Those which act mechanically, as strangulations, injuries, wounds, &c.: and, 4th, Those which act sympathetically.—*A.* The *causes acting directly upon the bowels* are the *ingesta*, whether alimentary, medicinal, or poisonous.—*a.* The *food* often occasions enteritis, gastro-enteritis, or entero-colitis, by its quality, quantity, variety, and incongruity. Heating, stimulating, or rich food, especially in great quantity, frequently produces muco-enteritis, and its several consequences and complications; whilst food which is unwholesome, septic, putrid, imperfectly preserved, or mouldy, or spoilt, or innutritious, generally occasions follicular enteritis, or entero-colitis, or dysentery. Too great a quantity of food, or incongruous or indigestible food, particularly after prolonged abstinence or fasting, is a frequent cause of the more acute forms of enteritis. Thus a quantity of cheese eaten in these circumstances has, in several instances which I have observed in the course of my practice, produced this effect. Amongst the alimentary substances most productive of enteritis, smoked, dried, and long-preserved meats, pork, ham, bacon, cheese, stale fish, and high-seasoned dishes, may be particularized.

86. *b.* The inordinate use of *spirituous* or other *intoxicating liquors,* is amongst the most common causes in the lower classes, particularly in hot climates and in warm seasons. Even a small quantity of spirits taken by persons unaccustomed to them, and during disorders of irritation affecting the alimentary canal, will often develop a state of inflammatory action. Unripe or stale fruit; too large a quantity of fruit or of vegetables; most acid and cold fruits, and particularly pine-apples, melons, and cucumbers; cold fluids or ices taken while the body is perspiring, or very soon after, or immediately upon, a meal; and acidulated beverages, or cyder, perry, &c., often occasion either enteritis, or some one of the disorders of the digestive organs most apt to pass into, or to be associated with this disease. The changes which the ingesta undergo in the stomach and bowels, especially when excessive in quantity or variety, or otherwise incongruous, and when imperfectly changed by the gastric juice and bile, give rise to enteritis either directly, or consecutively to indigestion, costiveness, colic or diarrhœa. The influence of the secretions, particularly of the bile, when redundant or acrid from the changes consequent upon interrupted excretion of it, in giving rise to ileo-colitis, has already been insisted upon.

87. *c.* The frequency of the several forms of enteritis in young children, particularly infants brought up by hand or after weaning, is caused chiefly by the inappropriate or too abundant supply of food, in these circumstances. The digestive organs cannot dispose of the food, either from its quality or quantity, and the undigested part irritates the digestive villous surface, or undergoes changes producing the same effect. In some instances

the disease, especially the follicular variety of it, is caused by the insufficient quantity of aliment obtained from the food, owing to its unsuitableness to this early period of life, this cause combining with the irritation produced by the undigested portion. The milk, also, of some nurses, owing to the state of their health, and of their digestive organs, or to their habits, especially in resorting to spirituous liquors, occasionally gives rise to enteritis, or gastro-enteritis, in the infants suckled by them.

88. The influence of an innutritious and fluid diet in causing muco-enteritis and follicular enteritis, the latter especially, particularly when aided by cold and humidity, or by miasmata, or by foul or unwholesome water, has been too much overlooked. A starving diet and regimen not infrequently develop these forms of the disease in an asthenic form, or in the guise of chronic diarrhœa or chronic dysentery, particularly in persons previously accustomed to live fully or intemperately; and if these disorders prevail in a number of persons, either crowded together or shut up in ill-ventilated apartments, adynamic or typhoid fevers will be generated, complicated with the enteric disease. The influence of stagnant and foul water, more especially water long shut up in wooden casks, and river or canal water containing animal matter or impurities conveyed by the sewers running from cities or large towns, in producing follicular enteritis, is much greater than is generally supposed. The use of impure water favours the production of the disease when other causes are in operation, and imparts a specific, generally an asthenic, character to the malady. It has the effect of a slow poison, and acts on the economy not merely by impairing the tone of the organic nerves, and villous surface of the bowels, but also by contaminating the circulating fluids, and thereby producing not only a local, but a constitutional, disease at the same time. In this disease, the general and local asthenia is more prominent than inflammatory action, which is limited to the intestinal glands and follicles, and is often characterized by a tendency to ulceration or disorganization, rather than to reparation.

89. *d. Medicinal substances*, particularly acrid purgatives, stimulants and tonics, injudiciously resorted to, are more frequently the causes of enteritis than is commonly supposed; the effects of these medicines being often mistaken for the natural course of the disease. Acrid purgatives, given with the view of removing indigestion, colic, or constipation, and injudiciously repeated, in circumstances requiring milder means, have often converted these complaints into acute enteritis, or have aggravated inflammation where it already existed. Stimulants and tonics, prescribed with the view of removing debility, and the various forms of indigestion, have likewise developed a latent inflammation, or changed slight inflammatory action, giving rise to symptoms mistaken for those of debility merely, to acute enteritis, or to gastro-enteritis. I am, moreover, convinced, from personal observation, during an early part of my experience, when I had opportunities, in different climates, of observing, without interfering with the practice of medical officers in charge of hospitals, and, from the perusal of the journals kept by others, that numerous cases of diarrhœa, and still more of dysentery, have been aggravated into the most acute forms of enteritis, or of entero-colitis, by the repeated, continued, and extravagant exhibition of acrid, or heating cathartics. I have in my possession hundreds of cases of these diseases, written by the medical men who treated them, in all of which the usual phenomena of inflammation, when seated in the villous surface of the intestines, and attended by morbid action of the muscular coats, were viewed as the consequences of the accumulation and retention of morbid secretions and fæcal matters, and treated by large doses of cathartics prescribed not daily only, but at intervals of a few hours, and thus persisted in until the dissolution which they either caused or accelerated took place. The fire once kindled, however slightly or weakly burning, was thus fanned to a blaze, which soon extinguished itself in fatal disorganisation. A slight diarrhœa, or simple dysentery, arising from irritation or determination to the intestinal villous surface, has been converted, by a continued use of the most drastic purges, into inflammation, which, in its turn, has been urged on, by the same agents, to fatal sero-enteritis and peritonitis, with sphacelation of the villous coat.

90. *e. Poisonous substances* are amongst the most common causes of enteritis, but generally complicated with gastritis — of gastro-enteritis. Some poisons, however, pass into the bowels from the stomach, without affecting the latter in a very sensible manner. Most of the mineral poisons, and of the acrid and acro-narcotic poisons, inflame the mucous surface of the intestines; and when they fail of producing fatal results by the intensity and the extent of inflammation, by their injurious impression on the organic nervous influence, and by the change they produce in the blood, — by these effects, individually and conjointly — they are generally the cause of a severe and often prolonged form of enteritis, which, however, differs materially, in its precise seat, and in its characters, according to the particular agent which excited it. (*See* article Poisons.)

91. *B. Those causes which act indirectly*, and chiefly by suppressing accustomed secretions or excretions, and by determining the momentum of the circulation upon the abdominal viscera, are exposures to sudden vicissitudes of temperature, especially in connection with humidity and the influence of malaria; sleeping in damp beds or clothes, or in exposed places, or on the ground during campaigns; the abstraction of the animal heat from the feet, the loins, and abdomen; unusual heat applied to the back and loins; and the drying up, the suppression, or the disappearance, of accustomed discharges, evacuations, or eruptions. Enteritis is often caused by the suppression of an accustomed perspiration of the feet. Sleeping on the ground, or exposed to the night dews, especially after a debauch or the excessive use of spirituous liquors, is a very frequent cause of this disease, and particularly of phlegmonoid or sero-enteritis and colitis, amongst soldiers and sailors, especially in warm or inter-tropical regions. I have seen instances of the disease occasioned by sitting with the back to a warm fire at dinner; by the suppression of the catamenia, and by arresting, or preventing the returns of, the hæmorrhoidal flux, without instituting such precautionary measures as the circumstances of the case required.

The repulsion of *gout* or of *rheumatism* from the extremities has, in rarer instances, a similar effect, and enteritis appearing in these circumstances presents certain peculiarities, especially in the gouty diathesis, or when it occurs from the retrocession of gout from the feet. It is then always very acute, is attended by intense pain, and is characterised as much by the extreme morbid sensibility of the parts affected as by the severity of the inflammatory action, the former pathological condition requiring more attention from the physician than even the latter.

92. *C.* Many of the causes of enteritis are altogether *mechanical*, and act either *internally* or *externally* in respect of the canal of the intestine. — *a.* The former consist chiefly of hardened fæces obstructing the tube, or lodged in the cells of the colon; concretions of various kinds; and the inordinate distension occasioned by gases or fæcal accumulations. Hardened fæces and concretions first irritate, and afterwards inflame the parts in contact with them, if the muscular action of the coats of the bowel fails in procuring their expulsion, and a somewhat similar effect is produced by retained or accumulated fæces and morbid secretions. The over-distension occasioned by flatus weakens the coats of the intestine, overcomes their power of re-action, and favours the suppression of the natural exhalations and secretions, and the consequent developement of inflammation, in the over-distended part.

93. *b.* The mechanical causes of enteritis *external* to the canal are hernial strangulations, and strictures of any kind which diminish the diameter of the canal; intus-susceptions, the pressure of tumours developed within the walls of the abdomen and pelvis, and injuries, wounds, or operations. — Every patient who complains of the usual symptoms of enteritis, especially of vomiting and constipation of the bowels, should undergo a strict examination, in order to ascertain the existence or non-existence of the several kinds of hernia. The presence of hernia in connection with enteritis indicates at once both the nature and the cure of the disease: but hernia or external strangulation may exist without the lesion being manifest, or its seat or cause being detected, or even admitting of detection, although suspected and carefully inquired after; and the mischief may be caused by an old hernia, or in connection with an old protrusion, which can no longer be detected on examination. When internal strangulation exists, the symptoms of ileus, or of acute enteritis, or of both in succession, are usually present. The seats and causes of strangulation are so numerous, as shown and described in the articles on COLIC and ILEUS (§ 37.), and DIGESTIVE CANAL (§§ 56, 57.), that we can but seldom come to a correct conclusion respecting them, unless they are subjected to our senses, as in the case of external hernia: yet we may occasionally, from a review of antecedent and concomitant circumstances, draw inferences, not only as to the existence of internal constriction or strangulation, but also as to its source, that will approximate, although they may not be altogether, the truth. Either of the many causes which I have enumerated, in the article just referred to, as productive of *ileus*, may also occasion enteritis, the inflammation generally commencing at the point of stricture or strangulation, and in the peritoneal coat, and extending thence usually to the distended portion of intestine above this point, and to the rest of the tunics.

94. *c. Intus-susceptions* produce, as shown at another place (COLIC and ILEUS, § 38. *et seq.*), either *ileus* or *enteritis*, or both, either coëtaneously or consecutively. Where enteritis takes place, it usually proceeds from strangulation of the introsuscepted portion of intestine, and assumes a most acute form, the inflammation generally commencing in the serous coat, implicating the rest of the coats, and sometimes terminating in gangrene and even in the discharge of the gangrened portion of intestine, the canal being preserved by the union of the edges of the divided intestine. But this subject is fully described in the place just referred to, and also in the article DIGESTIVE CANAL (§§ 54, 55.).

95. *d. Tumours* formed in any part within the abdomen, may, from the injurious pressure, or from the irritation occasioned by them, or from the extension of inflammation from their surface to the serous coat of the intestines, give rise to enteritis. Tumours in the omentum, in the ovaria, or connected with the uterus, sometimes cause inflammation in either of these modes, particularly in the former; this effect being the more readily produced when the tumour is hard, cartilaginous, or osseous; or when it is very large, so as to interrupt by its size and pressure the transit of the more consistent contents of the bowels; or when an injury or blow is received upon or in the vicinity of the tumour. The lymph effused on the surface of an adjoining viscus will excite inflammation in whatever portion of the serous surface of the bowels, with which it may come in contact: enteritis thus occasionally appears consecutively upon inflammation of adjoining organs from the contact of a morbid secretion chiefly, and not from extension of the inflammatory process over a continuous surface. External injuries and wounds are occasionally causes of enteritis, particularly of serous or phlegmonoid enteritis; and gangrene of the injured and inflamed part sometimes takes place.

96. *D.* Mucous and follicular enteritis may occur *sympathetically* of some severe disease or extensive injury of external parts. Either of these varieties may be consequent upon burns or scalds, or upon erysipelas, or upon disease of some vital organ. They constitute, the latter variety especially, the most frequent complication of continued, and even of periodic fevers, and more particularly of the eruptive fevers; and they are often sequelæ of these fevers. My friend Dr. ABERCROMBIE, of Cape Town, informed me that, when measles were lately epidemic at the Cape of Good Hope, where they were imported after an absence of upwards of thirty years, the great bulk of the population being, in consequence, susceptible of their infection, enteritis sometimes occurred upon the decline of the eruption, but that it appeared much more frequently during convalescence, or a few days after the patient had apparently recovered.

97. IX. TREATMENT. — The *indications*, as well as the *means* of cure, necessarily vary in the several varieties of enteritis, and in the different circumstances in which they present themselves. Some reference ought also to be had to the causes which produced the disease, and to the state of vital tone or energy, especially if the complaint appeared in the course, or as a sequela, of any other. I shall

therefore describe the treatment most appropriate to the principal forms of the disease, and to the chief circumstances with which it is usually connected.

98. i. *Muco-enteritis* and *muco-entero-colitis* differ only in the extent to which the digestive canal is affected in its internal surface, and in the different portions of this surface; both varieties being the same in their natures and morbid relations. The means of cure are, therefore, equally suitable to both: — *A.* In the *slighter states* of the complaint, and in the less robust constitutions, *local depletions*, chiefly by leeches applied to the abdomen, will be generally requisite; but in strong, young, or plethoric persons, a moderate or full bloodletting from the arm should be premised. Immediately afterwards, small doses of calomel, or of blue-pill, or of the hydrargyrum cum cretâ, the last especially, should be given with ipecacuanha, or with the compound ipecacuanha powder, and repeated every four, five, or six hours. If the bowels be insufficiently evacuated, and if the stools be morbid and offensive, mild purgatives, as sweet oil, castor oil, or both, may be given, and emollient and aperient enemata administered. After these have operated satisfactorily, a warm bath or the semicupium may be resorted to, and Dover's powder, or the combinations of ipecacuanha just mentioned, may be exhibited so as to relax the external surface; and perspiration may be promoted by suitable diluents and warm mucilaginous fluids, or by these latter containing the liquor ammoniæ acetatis with the spiritus ætheris nitrici, and small quantities of the nitrate of potash. Or these may be taken in camphor julep, or any other suitable vehicle. When there is nausea or occasional vomiting, the medicines containing ipecacuanha may be laid aside for the latter preparations, which may be taken in small but frequent doses, in any emollient or soothing vehicle most grateful to the patient. In such cases, the stomach and bowels should be quieted, and their functions excited as little as possible until the morbid action has subsided. In mild cases, these means, aided by a farinaceous, mucilaginous, and spare diet, will generally be sufficient; but, in severer attacks, a repetition of the more active of these, and the aid of additional remedies, will be requisite.

99. *B.* When the disease occurs in the *most acute form*, particularly amongst Europeans in warm or inter-tropical countries, and as described above (§ 45.), a copious bloodletting ought never to be neglected; and the antiphlogistic treatment and regimen should be strictly enforced. In this state of complaint local depletions will often be requisite, even after blood has been taken freely from the arm, and will sometimes require to be repeated. Leeches may occasionally be applied around the anus, preferably to any other situation, more especially when any degree of congestion of the liver is suspected. If the attack be attended by vomiting, and the large intestines seem but little affected, calomel or the Hydrarg. cum cretâ may be given with opium, and repeated according to circumstances; the bowels having been sufficiently evacuated, and being kept open by copious oleaginous enemata; but, if the stomach be not irritable, after having evacuated morbid secretions and fæcal accumulations, ipecacuanha may be prescribed with opium and the nitrate of potass, as in the original Dover's powder, in as large and frequent doses as the severity of the case may indicate. After depletions have been sufficiently practised, the warm bath, semicupium, or hot fomentations, taking care to keep the bedclothes perfectly dry, may be allowed. In these cases, as well as in all the other varieties of enteritis, the more acute especially, the turpentine fomentation on the abdomen, or the liniments in the *Appendix* (F. 295. *et seq.*), employed as embrocations in this situation by means of warm flannels, will be found the most serviceable. As long as evidence is furnished of the presence of morbid secretions and fæcal collections, the milder mercurials and laxatives or aperients should be prescribed, and opiates withheld, until the causes of irritation are evacuated. The safest laxatives or aperients are sweet oil and castor oil, if they be perfectly fresh; but, if they be at all rancid, they will greatly increase the mischief. If these means, energetically pursued, do not remove the disease, it generally passes into the sero-enteric form, or into the second stage of that form, with marked exhaustion; a very different treatment being then indicated, although with little hope of success.

100. Upon the whole, the treatment of the milder forms of muco-enteritis should be nearly the same as is recommended for the more inflammatory varieties of Diarrhœa (§§ 27, 28.), and that of the more acute cases, particularly when the large bowels are chiefly affected, ought not materially to differ from what I have advised for the inflammatory states of Dysentery (§§ 82—87.); and the greater part of what I have stated in these places altogether applies to the present subject.

101. *C. The Chronic forms* of *Muco-enteritis*, and of *muco-entero-colitis*, require merely a modification of the above treatment, appropriately to the age, strength, and vascular states of the patient. Local depletions are sometimes necessary also in these forms of the disease, and should even be repeated according to circumstances. The chronic state is often owing to the indulgence of the patient in too much or too rich and stimulating food. When this is the case, then a more rigorous diet and regimen are requisite. A diet consisting chiefly of farinaceous and gelatinous substances, of milk, sugar, chicken or veal broth in small quantities with rice, &c., warm clothing, flannels worn next to the skin, warm baths, and assiduous friction of the surface of the body, aided by exercise, travelling and change of air, will generally be found most beneficial in these cases. But the disorder may have somewhat changed its character in passing from the acute to the chronic form: a too rigorous diet, during the former state, may have favoured the developement of follicular enteritis upon the subsidence of the inflammation of the villous surface. Consequently the persistence of a chronic disorder after the acute should lead to a careful examination of the local and constitutional symptoms, and of the evacuations; and if these be marked by asthenia, or cachexia, the stools being mucous, muco-puriform, or ochrey, and the pulse weak and very quick, the means about to be recommended for the follicular variety of the disease should be prescribed.

102. *D. In infants and young children* — *a.* the

acute form of *muco-enteritis* requires nearly similar means to those already prescribed, but with due reference to their age and their previous nourishment. For them, local depletions, the Hydrargyrum cum cretâ, with ipecacuanha in small doses, or DOVER's powder, and the warm or tepid bath or the semicupium, or stupes or fomentations, will generally be necessary.— For infants, however, DOVER's powder and all other preparations containing opium, ought not to be prescribed; nor, indeed, should the alvine evacuations be suddenly arrested by these, or other means, in young children. When the complaint is attended by much irritability of the stomach, a full dose of calomel will be of service, and if the child be not very young, a small dose of opium may be given with it; and the bowels, which are usually then costive, should be moved by emollient laxative enemata. When the stomach is not irritable, and the bowels are much relaxed, the stools being morbid, I have often found small doses of the bi-borate of soda taken in honey, or in dill-water with paregoric elixir and mucilage, of great service, after calomel or the Hydrarg. cum cretâ had been prescribed. In such cases, also, the warm bath, stupes and emollient enemata are very beneficial. In older children, when the bowels are very irritable, and the stools contain blood, small doses of the syrup of poppies, or of paregoric elixir, may be added to these or to the starch enema, or to an enema of thin gruel, or of warm water, or of strained veal or mutton broth; local depletions having been resorted to, according as they may have been indicated, and ipecacuanha or DOVER's powder given in frequent doses. On the other hand, the bowels ought not to be allowed to be costive. When children will take sweet oil it is the mildest and most suitable aperient in this disease, and it should always be employed in laxative enemata. In the more severe cases, or after local depletions, the warm bath, fomentations, and suitable medicines have been prescribed, without satisfactory results, mustard poultices, or the warm turpentine fomentation may be resorted to, and be kept on the abdomen until smarting or burning heat is produced. Either of the turpentine liniments in the *Appendix* (F. 296. 311.) may be employed in this manner, with the addition of the tincture of opium, when the stomach or bowels are very irritable. — In grown children, opium with calomel or Hydrarg. cum cretâ, and with ipecacuanha, or this latter with nitre and opium, in suitable doses, are the most important remedies when employed after vascular depletion.

103. *b.* In the *chronic cases* of muco-enteritis, or of entero-colitis in *children*, repeated small doses of Hydrarg. cum cretâ, with ipecacuanha, or with DOVER's powder, the warm bath, or fomentations, and subsequently blisters on the abdomen, if the foregoing means are inefficient, are generally necessary. But in this state of the complaint, diet and change of air, especially to a high and dry locality, are most beneficial. Advantage will be obtained, also, from the warm bath, followed by frictions of the surface, and the application of a flannel roller round the abdomen. The bowels should be duly regulated by means of mild mercurials, rhubarb, magnesia or sulphate of potash, or of sweet oil, castor oil, manna, &c., aided by enemata, according to the peculiarities of the case. In other respects, the treatment advised in the mucous and chronic states of DIARRHŒA (30—36.) should be adopted.

104. *c.* In both the acute and chronic states of the complaint, the utmost attention should be paid to the *diet* of infants and children. When there is much irritability of the stomach indicating an extension of disorder to the duodenum and stomach, endeavours to give food or even medicine are more injurious than beneficial until the severity of the attack is abated by local depletions and external means. If a full dose of calomel with or without a little calcined magnesia is retained, as it generally will be in such cases, nothing ought further to be given for two or three hours, when gum-water with equal parts of the milk of a healthy nurse or of asses' milk, or gum-water slightly sweetened, may be administered in small quantity, one or two tea-spoonfuls being given at a time. In these cases, no other purgative than calomel will be retained in the stomach. The bowels must therefore be opened by means of the enemata already mentioned. The diet and regimen must entirely depend upon the state of the bowels. If they be relaxed, the milk may be taken with lime-water. As the acute symptoms subside, more nutritious kinds of light food and farinaceous articles may be allowed. Chicken broth or veal or mutton broth may be taken with rice; and mild tonics, with the alkaline subcarbonates and small doses of ipecacuanha, should be prescribed when the digestive functions are much weakened. The means so fully insisted upon in the several forms of DIARRHŒA (see more particularly § 35—52.) may severally be employed according to the peculiarities of individual cases. In the sub-acute and chronic states of the disease, particularly in recently weaned children, or in infants that are attempted to be reared by hand, the kinds of milk just mentioned may be given, *immediately upon being drawn*, either with gum-wáter, or with a little cinnamon water, or with lime-water, or with barley-water, according to the states of the bowels.

105. ii. *Treatment of glandular and follicular enteritis* and *entero-colitis.*— *A.* The indications and means of cure in the *acute states* of these varieties entirely depend upon their exciting causes, their association with muco-enteritis, and the state of the constitutional disturbance. The *first* object is to ascertain the cause or causes of the malady; the *next* is to ascertain the state and stage of the local and general morbid action. It is necessary not merely to remove the causes, but also to counteract the poisonous influence they have exerted both locally and constitutionally. A reference to these causes (§§ 18. 83.) will show the necessity of thus extending our views in the treatment of these varieties. It must not be overlooked, that many of these causes are of a septic or poisonous nature — that they consist of putrid, decomposed, and decomposing substances, vegetable or animal, or both, which act as a poisonous or contaminating leaven upon the digestive mucous surface, on the intestinal glands and follicles, and upon the blood; and that this effect, although most demonstratively produced on these glands and follicles, does not always, at least in its earliest stage, consist of true or of sthenic inflammation. The vital condition of these follicles is changed, but not in such a manner as to develope an excited condition of their capillary circulation: an opposite state — an asthenic con-

gestion with impairment of their vital manifestations and vital cohesion — more probably obtains. For it is uniformly observed, that when the causes are of the above description, or when they are such as debilitate, or even such as insufficiently excite or nourish the frame, as inappropriate, innutritious, fluid and unwholesome food, a treatment of a lowering or depleting kind is always injurious. As this morbid condition of the glands and follicles of the digestive villous surface often rapidly passes into ulceration, it has been too generally viewed as being altogether of an inflammatory nature. This error has arisen from two circumstances; — *first*, the general belief that ulceration can proceed only from antecedent inflammation; and *second*, that inflammation is a state of vascular action always attended by one and the same condition of vital tone or power, and that the tissues affected by it possess the same degree of vital cohesion on all occasions. Now I have shown, in other places, that ulceration may occur and proceed without any appreciable grade of inflammation, and more particularly of true or sthenic inflammatory action; and that inflammations, or rather that the states of local vascular action, to which the term inflammation has been too generally and often inappropriately applied, are widely different from each other, in respect of a great variety of both local and constitutional phenomena; and that these states vary, as regards the condition of the tissues and vessels, and circulating fluids and vital manifestations, not only in each of their more specific forms, but also in each of their progressive periods or stages. It may therefore be inferred that, when ulceration is produced in the intestinal glands by septic or contaminating ingesta, it assumes somewhat of a phagedenic character, and that the state of vascular action preceding or giving rise to this effect is either not truly inflammatory, or is that to which I have applied the term of *asthenic inflammation* (see that article, § 54. *et seq.*), and which requires, both locally and constitutionally, a very different treatment from that appropriate to the more common inflammatory condition.

It is not improbable, however, that inflammation commencing in the villous surface itself will extend to the follicles, and even that both it and the follicles may be almost coëtaneously attacked; or that the affection of the former may subside as that of the latter is developed; but of either of these states of disease we have no certain proofs at an early stage, although appearances after death frequently show that they must have existed. The chief difficulty is to ascertain the symptoms by which they are severally, or conjointly, attended and indicated, more particularly during early periods of life, when this morbid association is common; and even at much later periods so minute a diagnosis as this is can rarely be made with precision. When we have reason, from the nature of the exciting causes, from the character of the symptoms, and especially from the state of the evacuations, to infer that disease of the follicles is associated with inflammation of the villous surface; or when the more usual phenomena of follicular enteritis cannot be connected with the septic and lowering causes mentioned above (§§ 18. 85.), and when the symptoms indicate more or less of vascular excitement, locally or generally, local depletions, followed by the warm bath, by the semicupium, or by the rubefacient embrocations or fomentations already noticed (§§ 296. 311.), will then be requisite. If fæcal collections have not been removed by the natural action of the bowels, calomel with rhubarb, or the latter with sulphate of potash, or the compound jalap powder may be given, and be aided by suitable injections: afterwards, frequent doses of the Hydrarg. cum cretâ, with DOVER's powder or with ipecacuanha and rhubarb in small quantity, may be prescribed, according to the circumstances of the case; and the turpentine fomentations already mentioned (§ 99.), may be applied on the abdomen. The treatment in such circumstances should not vary materially from what is advised for the more acute forms of *mucous diarrhœa* (§ 99.), and for *dysentery*, according to the features of individual cases.

106. After the more acute symptoms have subsided, and in the more asthenic cases, more restorative, astringent, and antiseptic remedies may be employed; and more especially those recommended for the *mucous* and *chronic forms of* DIARRHŒA (§ 31. *et seq.*). If the stage of the disease, the state of the evacuations, and the constitutional symptoms, indicate the accession or progress of *ulceration*, the means advised in the article just referred to (§ 32. *et seq.*) should be resorted to. In such cases, as well as in those which have followed the ingestion of septic and contaminating substances, I have found the following of more or less service with or without the addition of opium to either of them, as circumstances may have required.

No. 279. ℞ Hydrarg. cum cretâ ℈j.; Pulv. Ipecacuanhæ gr. viij.; Pulv. Rhei ℈ij.; Creasoti ♏ xij.; Mucilag. Acaciæ q. s. M. Fiant Pilulæ xviij. quarum capiat duas ter quaterve quotidie.

No. 280. ℞ Pulv. Ipecacuanhæ gr. xvj.; Argenti Nitratis Pulver. gr. viij.; Extracti Humuli ℈iv.; Extr. Papaveris ʒss.; Olei Carui q. s. Tere bene et forma in massam æqualem quam divide in Pilulas xxxij., quarum capiat unam vel duas ter quotidie.

No. 281. ℞ Calcis Chloridi gr. ss. ad gr. j.; Aquæ Cinnamomi ʒix.; Mucilag. Acaciæ ʒij.; Tinct. Camphoræ Comp., Tinct. Humuli, Tinct. Cardamom. Comp. āā ʒj. M. Fiat Haustus, pro re natâ sumendus.

No. 282. ℞ Calcis Chloridi Pulv. gr. viij.; tere cum Pulv. Tragacanth. Comp. ʒj. et adde Pulv. Ipecacuanhæ gr. viij.; Bals. Peruv. q. s. ut fiant Pilulæ xviij.; quarum capiat duas ter quarterve in die.

107. *B. The chronic states of follicular enteritis*, and *entero-colitis*, particularly when ulceration has commenced, can be ameliorated or cured only by strict attention to diet and regimen, as well as by the appropriate use of medicine. Of the latter, but little can be added to what has already been stated with reference to the treatment of *chronic mucous diarrhœa* (§ 31. *et seq.*), and *chronic dysentery* (§ 100. *et seq.*). The various methods and diversified means there enumerated are appropriate to the states of the disease now under consideration; and the treatment recommended for chronic muco-enteritis is also partially applicable to them. In the follicular form, however, of chronic entero-colitis, the means of cure, both medicinal and dietetical, should be even more restorative than I have advised for the other varieties of enteritis. In many cases, both medicines and diet should be prescribed almost experimentally, the effects of both being carefully watched; for it is impossible to infer correctly the effects of the several means in all or even in the great majority of cases. In many instances, and in several circumstances in which they occur, powerfully tonic and astringent remedies are most beneficial; whilst in others

alterative and absorbent medicines are most useful. A spare and farinacious diet is usually recommended; and yet abstinence may be carried too far, nutritious and digestible food being often required, especially when the disease is prevailing epidemically, or when it proceeds from the more debilitating and contaminating causes. In addition to the means already mentioned, both here and in the articles just referred to, others variously combined, according to the ever-changing features of individual cases, may be employed, more especially sulphate of quinine, or the nitrate of silver, with camphor and the extracts of hop and of poppy; the sulphates of quinine and of iron with these extracts, or with catechu, purified ox-gall, and capsicum; the sulphate of zinc or of copper, or the acetate of lead, with ipecacuanha and opium; the tincture of the muriate of iron, or chlorine-water, with the compound tincture of camphor or of cinnamon; and any of the various astringents, tonics, and absorbents, usually employed. In this variety of the disease, the chloride of lime, or the chlorate of potash, or any of the mineral and vegetable astringents, tonics, and antiseptics, may be prescribed according to circumstances: but those astringents which are also antiseptics should be preferred; and be conjoined with the preparations of bark, or of cascarilla, or of tormentilla, &c. When the follicles and glands of the large bowels are chiefly affected, and the disorder has become chronic, or if ulceration be expected, many of the substances just mentioned may be employed in enemata, as the nitrate of silver, the sulphate of zinc, lime-water, chlorine-water (*Pharm. Dubl.*), the infusion or decoction of bark with the compound tincture of camphor, or syrup of poppies; the chlorate of potash, or the chlorides similarly combined; and the various astringent and tonic infusions and extracts.

108. *For infants and children* affected by acute or chronic follicular enteritis and entero-colitis, very nearly the same means as have been advised for them, when suffering under muco-entero-colitis (§§ 102, 103.), will be found appropriate. As, however, the follicular variety of the disease in this class of patients is more especially caused by insufficient or unwholesome nourishment, by an unhealthy nurse, by a spoon diet, by rearing by hand or premature weaning, by cold and humidity, and particularly by living in a miasmatous atmosphere, or in low, damp, and ill-ventilated cellars and apartments, a removal of these causes, and attention to suitable diet and regimen, become most important parts of the treatment. The patient should be warmly clothed in flannel, and always sleep in the arms of a healthy nurse, or have asses' milk warm from the animal. The diet should be regulated in other respects as already advised (§ 104.). In this, and in similar states of disease of the digestive canal, the jelly prepared from the Ceylon moss is a most appropriate article of food. In aid of these means, change of air, particularly from crowded towns, and low, close, or unhealthy localities, to open, airy, dry, and temperate situations, or to the seaside, should always be prescribed.

109. iii. *Treatment of phlegmonoid or sero-enteritis.* — When the inflammation either seizes primarily upon the substance of the intestines, or extends to it, or commences in the peritoneal coat, vascular depletion should be immediate and copious, and other remedies promptly employed. If the patient be plethoric, young or robust, blood should be taken very largely from the arm, and leeches applied afterwards upon the abdomen. A full dose of calomel and opium — from fifteen to twenty grains of the former and two to three grains of the latter, with or without a grain or two of ipecacuanha, according to the state of the stomach — ought to be taken immediately after the bleeding, and the hot turpentine fomentation applied over the whole abdomen. This last should be kept constantly applied, or should be renewed, until the symptoms have abated. If the stomach be irritable, the calomel and opium taken after the bleeding, and without the ipecacuanha, will remove this symptom, and will, particularly when aided by the hot turpentine fomentation, determine the circulation to the surface, equalize the distribution of blood, and promote perspiration; and when the fomentation can be no longer endured, a warm bread-and-water poultice may replace it, and may be frequently repeated. If these means give relief, with a copious and general perspiration, the patient should not be disturbed for a considerable time, nor the stomach and bowels irritated by purgatives or cathartics taken by the mouth; and as soon as it becomes requisite to procure evacuations and to remove offending matters, the oleaginous or other mild purgative enemata may be administered.

110. If the disease be very severe, or considerably advanced before this treatment is instituted, a repetition of both the general and local bleeding will often be necessary; and the calomel and opium, in the doses already stated, may be given once or twice daily, either until the secretions and evacuations become free, or until the mouth is affected, or the symptoms disappear. If the stomach be not irritable, and if the bowels have been evacuated, saline medicines may be prescribed at intervals; and the warm bath may be ordered, with the view of aiding the preceding means in equalizing the circulation and promoting perspiration. If the biliary functions be much disordered, or if the disease does not yield readily to the above means, the mercurial liniment or ointment may be placed upon the surface of the abdomen, and covered by a succession of warm poultices, or the former of these may be laid upon the surface of the poultices that is to be applied next to the abdomen. If this state of the disease be associated with hepatitis, local depletions below the right scapula, or over the right hypochondrium, should precede these applications.

111. As to the use of blisters in enteritis, much discretion is requisite. If they be employed before the disease, particularly this form of it, be in a very great degree subdued, they either fail of being serviceable, or they aggravate the morbid action; unless they are so large as to occasion a complete revulsion of the capillary action to the blistered surface — an effect they can seldom produce, unless the inflammatory action is slight in degree or small in extent, or has been nearly altogether removed by the previous treatment. In the early stages of the disease, the turpentine fomentation is greatly to be preferred, as it in no way aggravates the disease, but, on the contrary, remarkably tends to abate it, and to prevent the effusion of coagulable lymph, and in this, as well as in other ways, aids the beneficial operation

of bloodletting and mercurials. When, however, the disease is nearly subdued, the external inflammation and discharge produced by a large blister entirely remove the remaining morbid action, and prevent an exasperation or a return of it. In this period of the disease, and after the above fomentation has been used, a large blister may therefore be applied, and the discharge from it promoted by poultices and other means.

112. iv. *Enteritis with membranous or tubular exudations* is generally a chronic disease, and much less amenable to treatment than any other variety. M. Roche states that M. Burdin, a physician of large experience in Paris, informed him that local depletions, poultices, warm baths, emollient enemata, and a soothing regimen, proved most beneficial in his practice; and that a mucilaginous, diluent, and fluid diet was generally injurious; whilst mild bitter infusions, aromatics, and antispasmodics were preferred: and the former physician adds, that his experience accords with this statement. However, he has seen a case exasperated by the slightest stimulus, and cured by a severe antiphlogistic regimen; and another cured by drastic purgatives after other means had failed. Dr. Powell observed no benefit from the use of calomel. The practice which appeared to him most advantageous was the steady use of a mixture of the compound infusions of gentian and senna, with the addition of from ♏ x to ♏ xx of the solution of potash, so as to procure four or five stools in the twenty-four hours. Sir B. Brodie informed me that he has found small doses of cubebs serviceable in this disease,[1] aided by an occasional recourse to an active purgative. The purgative advised by Dr. Powell has been most beneficial in my practice; but I have found it requisite to apply leeches to the abdomen, followed by the turpentine fomentation and embrocation, by hot poultices, and emollient enemata. A frequent use of sweet oil, both as an article of diet and as an aperient, has also been of service. A light, nutritious, and solid diet has been generally requisite; at the same time avoiding stimulants and irritants. The treatment, however, will necessarily vary, or even be entirely different, in different cases, as the disease has always been variously associated or complicated in the cases which I have seen; these complications often requiring as much attention as the intestinal malady.

113. v. *During convalescence* from any of the several forms of enteritis, the regular action of the bowels is a matter of the greatest consequence, and should be promoted, when deficient, by mild and cooling aperients and laxatives. At the same time the secretions generally, and particularly the biliary secretion, should be corrected or promoted whenever they are deficient or morbid. For this purpose, an occasional dose of blue-pill or of the hydrarg. cum creta, or of Plummer's pill with soap, should be taken. A warm bath, followed by active friction of the surface with hair gloves, or with a coarse towel, will also be of use. The utmost attention ought to be paid to *diet*. A returning appetite should be indulged with great caution. Mild broths, in small quantity, with toast, or with boiled rice; the farinaceous articles of food, as arrow-root, sago, tapioca, &c.; and the jelly of the Ceylon moss, may be taken at first, and continued for some time before more stimulating and solid articles are allowed. The patient ought to wear flannel next his skin, and be careful not to expose himself to vicissitudes of temperature, or to moisture. He should always preserve his feet warm, and observe those articles of food which agree or disagree with his digestive organs, carefully avoiding those which have the latter effect. In all respects his diet and regimen should be regulated in the manner advised in the article Indigestion (§ 69. *et seq.*).

114. X. Of Spasm, etc. of the Intestines. — *A.* The muscular coats of the intestinal tube possess a very perfect degree of muscular power, and may be contracted in a very remarkable manner; even so as to propel quicksilver along its canal contrary to the specific gravity of this substance. The extent of spasmodic contraction of the intestines is rarely demonstrated to the sense of sight, even after death. But in dissections performed a few hours after dissolution it has been observed so extreme as very nearly to obliterate the canal. The spasmodic contraction of circular fibres, and of the muscular coats of hollow viscera, is shown by the action of the urinary bladder, of the intestines, and of the sphincters; and the extent of relaxation of these structures is demonstrated by the state of these parts both in health and disease. The healthy contractions of the intestinal canal push onwards its contents; but this contraction is speedily followed by relaxation. The passage of substances more or less stimulating along the villous surface excites the action of the muscular coat, and this action ceases in one part as soon as the stimulus passes onwards to a continuous part. Where, however, the muscular coats are spasmodically contracted there is, at least for a more or less considerable time, no consequent relaxation, as in the healthy state. It is very difficult to determine the extent to which spasmodic constriction takes place, in respect either of the amount of the obliteration of the canal it may occasion, or of the length to which it may affect the intestine, and the particular bowel affected. The spasm, there is every reason to infer, indeed it is sometimes demonstrated, may attack several parts at the same time more or less remote from each other, the intermediate portions being remarkably dilated; and it may proceed along the intestinal canal, either continuously or interruptedly, from the stomach downwards, or even in an opposite direction, as in colic, hysteria, and ileus, in which it may follow either of these directions. We can hardly suppose that the spasm extends, at the same moment, to the whole line of the canal, but merely to portions of it, which may be thus affected for a very varying and indefinite period. This affection may pass with rapidity from one part to another; and, as respects duration and recurrence, it may be continued, almost permanent, intermitting, remitting, periodical, and slight or tremulous. Some portions of the bowels are more subject to spasmodic action than others; as the duodenum, the lower portion of the ileum, and the lower parts of the large bowels.

115. *B.* Intestinal spasm is generally *associated* with disorder of the secreting functions of the liver, and of the digestive villous surface; and often also with inflammatory action in this surface. There is always more or less of irritation of this tissue, or rather of the nervous fibrils supplying this and the muscular coats; and this irritation is attended

by a more or less remarkable alteration of the sensibility of these nerves, which is roused often to the most acute pitch of sensation.

116. i. *Symptoms.*—The symptoms of spasmodic constriction of the intestines necessarily vary with its seat, degree, extent, duration, causes, and concurrent changes. In the great majority of cases they constitute the disease denominated *colic;* and in their more extreme or prominent state, particularly when spasm is associated with further change, or consists of a succession of retrograde actions emanating from a part more permanently contracted or obstructed, they constitute, or very nearly approach, the *iliac passion*, which, however, is often dependent upon obstruction from some other cause, and is frequently associated with inflammation. *Pain* is the most general attendant upon spasm, and, like it, is usually felt in paroxysms, or is exasperated, or is recurrent, intermittent, remittent, and more or less acute or violent. In some cases it is slight and irregular, or it assumes the above forms in a much less acute grade, as in the spasmodic intestinal contractions of *hysteria.* The pain characteristic of spasm is often more or less allayed by pressure, unless the spasm be excited by inflammatory action or associated with it. When the spasm affects the small intestines, there is commonly pain about the navel; and when it is attended with flatulent distension of the parts unconstricted, there is a tympanitic state of the abdomen, with borborygmi, and a sensation of the passage of air from one part to another, the pain often also shifting its situation. Spasm of the duodenum has been supposed to be indicated by pain in the right side, stretching to the back, and occasionally to the right shoulder, but often changing its place upon the expulsion of air; by distension of the abdomen, slight yellowishness of the conjunctiva or countenance, and deficiency of bile in the evacuations; and by a soft and sometimes an irregular pulse. These symptoms, however, do not furnish sufficient evidence either of the seat or of the nature of the affection, although they are attendant upon it in most instances; for they also accompany other complaints, more especially torpor and other functional disorders of the biliary organs. When the pain accompanying them is eased by pressure, and when none of the signs of inflammatory action is present, then the existence of spasm is extremely probable; but its seat is not the more certainly indicated by this circumstance. Nor does pain in the right side extending from the cæcal region to the right hypochondrium sufficiently prove the existence of spasmodic constriction of the commencement of the colon, although it is a sufficient reason to suspect the presence of this affection in this part. Both SAUVAGES and MONRO admit the difficulty of the diagnosis as respects the seat of spasm. This, however, is of the less importance, as the treatment is the same whatever may be its exact seat. But it is of the utmost moment to ascertain whether or not the spasm be caused by, or associated with, inflammatory action, or structural lesion; and this can be detected only by a careful examination of the previous history and present state of individual cases. The disposition, particularly in young subjects, of intestinal spasm to be followed by intus-susceptions, and by inflammation or ileus from this circumstance, should always be kept in recollection.

117. ii. *The Causes of Spasm of the Intestines* are also those of spasm in other parts.—*a.* The nervous temperament, and the delicately or weakly constituted, owing either to original conformation or to the operation of the usual causes of debility during infancy, puerility, and puberty, are most *predisposed* to this affection. Dr. GREGORY has very correctly and briefly stated the predisposing causes as follows:—"Habitus corporis nimis sentiens, et nimis mobilis, homines spasmis opportunos reddit; hinc malum fœminis, infantibus, debilibus, luxuriosis, desidibus, sanguine plenis, familiare."

118. *b.* The *exciting causes* are principally those which irritate the villous surface of the intestines, as all acrid, poisonous, or unwholesome ingesta; flatulence, acrid bile, retained or morbid secretions and excretions, mechanical irritants, calculi or concretions, foreign bodies, worms, biliary calculi either passing the biliary or other ducts or lodged in the intestines, exposure to cold, &c. Intestinal spasm is often caused by inflammation of the bowels, or by organic lesions implicating their coats; by the poison of lead, and by the numerous causes mentioned in the article on the several forms of COLIC and ILEUS. It is also frequently occasioned *sympathetically* by the irritation of dentition; by irritation or inflammatory action in the uterine organs, or in the urinary passages; and by affections of the mind, especially the more violent emotions. It is a frequent attendant upon hysteria, upon calculi in the kidneys or ureters; and it occasionally appears in the course of disorders of distant parts. It is also apt to occur in the gouty diathesis, either as misplaced gout, or in consequence of disorder of the biliary or intestinal secretions.

119. iii. The *treatment* of intestinal spasm does not differ from the treatment of *colic* and *ileus*, and it should be conducted according to the principles there detailed. The chief *intentions* are,—1st, To remove the cause or causes, whether those acting directly on the bowels, or those exerting a sympathetic effect: 2d, To remove the immediate attack: 3d, To combat associated or contingent disease, whether inflammatory or structural: and, 4th, To prevent a recurrence of the affection by such means as will prevent accumulations of morbid secretions and excretions, and promote a healthy condition of the secretions, whilst they restore the tone of the parts and of the system generally. It is unnecessary to describe the modes in which these indications may be carried into effect, as they are already stated in the article just referred to, and as they necessarily differ according to the peculiarities of each case. I may, however, remark that the use of opiates or of other narcotics should not be long persisted in, with the view of accomplishing the second intention, without alternating or combining them with mild purgatives or laxatives, or with deobstruents; taking care, at the same time, to remove inflammatory action, if it be present in any degree. Narcotics, especially opium or morphia, interrupt the biliary and intestinal secretions and excretions; and, although the latter is extremely efficacious in removing spasm, yet it counteracts the other indications. Much, however, will depend upon the modes of combining or prescribing it, and upon the other means employed. Hydrocyanic acid is often a most efficacious remedy in this affection. In the violent forms of it which sometimes occur in

the gouty diathesis, opiates and the hydrocyanic acid have been most efficacious, in my practice, particularly when given with camphor and an alkaline carbonate, or with the carbonate of magnesia or of ammonia, due attention being paid to the excretions, both fæcal and urinary. Belladonna is frequently of service, given either internally or applied by means of a plaster over the abdomen. The administration of narcotics or anodynes in enemata is occasionally beneficial; but I have seen the doses of those medicines recommended by some writers produce very serious effects. The spirit of turpentine thus employed is an efficacious remedy, especially when much flatulent distension is associated with spasm, and particularly when its antispasmodic operation is aided by the external application of it, in the form either of epithem, embrocation, or liniment, over the abdomen. Numerous other means may be resorted to in the different states of intestinal spasm. But they are fully noticed in the article on Colic and Ileus (§ 50. *et seq.*) The fact of spasm being not infrequently a consequence of congestion of blood, of local determination, and of inflammatory action, either latent or manifest, ought never to be overlooked in the treatment of these affections, more especially in the young and plethoric, and in those who live fully and take insufficient exercise.

120. XI. A Paralytic state of the intestinal canal occurs, but only in respect of portions of it, and much more rarely than the affection just noticed. Palsy even of a portion of the intestines is seldom complete. It is rather a state of over-distension or of inflation, during which the usual vermicular or peristaltic contractions of the bowel do not take place for a time; but this state is more rarely permanent: it generally disappears either gradually, or after the use of medicine or stimulating articles of diet. In its more extreme forms, it is occasionally consequent upon permanent or spasmodic constriction, or incarceration or strangulation, or other obstruction of a portion of bowel, and is commonly seated above the constriction; the inordinate distension caused either by flatulence, or by fæcal accumulations, or by both, as well as by the unceasing efforts to propel the contents of the distended intestine onwards, ultimately terminating in a loss of contractile power. In addition to these sources of partial palsy of the intestines, hysterical affections, irritation of the uterus, and more particularly diseases of the spinal chord or its envelops, causing more or less of paralysis of voluntary parts, may be mentioned.

121. A paralytic state of a portion of the intestines, particularly when consequent upon permanent contraction of a part immediately below it, is often followed by serious changes in the palsied portion. The secretions of its villous surface are suspended, and inflammatory action, quickly passing into ulceration, or even sphacelation, soon supervenes. Indeed, these consecutive changes may take place even in those parts which are not completely paralysed, but which, having lost much of their contractile power, continue more or less distended; this condition, in connection with the influence of accumulated and pent-up flatus, arresting the secretions of the part, and favouring the occurrence of inflammatory action and its usual consequences. In cases where permanent contraction, or obstruction, of a portion of bowel exists, from changes about to be noticed (§§ 127, 128.), the parts immediately above the contraction are generally found inordinately dilated, ulcerated, ruptured, or even sphacelated; and others still higher up the bowel are occasionally spasmodically constricted,— changes resulting from the inordinate efforts made to propel the contents of the intestines. A partially paralysed state of the bowels may likewise proceed from inflammation of the part thus affected, the muscular coats being thereby rendered incapable of contracting.

122. i. *The symptoms* of palsy of the intestinal canal are chiefly constipation, distension, with a tympanitic state of a part or of the whole of the abdomen* upon percussion; a weak, quick, small, and often an irregular pulse, and occasionally vomiting. — The other symptoms vary with the changes either occasioning, or associated with, the palsied condition — with the presence of inflammation, of disease of the spine or spinal chord— with uterine or urinary irritation, or with hysterical affections. When the spinal chord is seriously affected, and in certain severe forms of hysteria, the urinary bladder is often also paralysed; and the voluntary muscles, particularly those of the lower extremities, and sometimes those of the abdomen and superior limbs, are similarly affected.

123. ii. *The treatment* should be conducted with a strict reference to the source of the affection, and to the disorders attending or complicating it; and this can be accomplished only after a strict examination of the history and existing state of each case. If the loss of contractile power proceed from a more or less permanent contraction, or from incarceration or strangulation of a portion of bowel, or from pressure or some other mechanical cause of obstruction, the removal of the source of mischief is the primary object of treatment. Other associated lesions just mentioned also require immediate attention, as either causing or perpetuating the palsied state. It is comparatively rare that this affection of the intestines is primary and uncomplicated; and it is consequently but seldom that the means of cure should be solely directed to it. But when it is thus primary and simple, or dependent upon disease or injury of the spine, warm purgatives and carminatives, given by the mouth and administered in enemata, are then beneficial; and these may be combined with various antispasmodics, more particularly those just mentioned (§ 119.). If, however, there is any reason to suppose that the loss of contractile power is either a consequence of, or associated with, inflammation of the bowel, or even that the distended portion of intestine has passed into this state, then these means may be more injurious than beneficial, and the usual remedies for enteritis, according to the state of local and general action, and of constitutional power, should be resorted to. In such cases, a careful examination of existing symptoms, and the presence of those already shown to attend the several forms of en-

---

* In some cases of *lead colic*, I have found the colon so enormously distended from flatus and loss of contractile power, that I could distinguish its form and course, in the different abdominal regions, by the eye when standing at a considerable distance from the patient; and yet the bowel has been restored to its healthy state by repeated injections containing turpentine, castor oil, &c., aided by stimulating frictions on the spine, abdomen, &c.

teritis, will guide the practitioner, both in the diagnosis, and in the treatment.

124. XII. RUPTURE OF THE INTESTINES is generally a consequence of pre-existing disease of the ruptured part or its vicinity. It never takes place in the healthy bowel, unless when caused by external violence, as the kick of a horse, or the passage of a carriage-wheel over the abdomen. — *A.* The *symptoms* vary in these cases according to the amount of hæmorrhage which takes place from the ruptured part. But the vital powers always evince great depression from the shock and the nature of the injury; the features becoming pale and collapsed, and the pulse feeble, small, or slow, and the surface and extremities cold. There is also very acute pain in the abdomen, with vomiting or syncope, in most cases.— When the rupture proceeds from softening or ulceration, there is seldom any hæmorrhage, and the symptoms are nearly those which arise from perforation of the intestines; great and general distension, pain and tenderness of the abdomen, a small frequent pulse, vital depression, vomiting, constipation, decubitus on the back with the knees drawn up, and the other symptoms of peritonitis, from effusion into the peritoneal cavity being present.

125. The *treatment* in the above circumstances consists chiefly of the exhibition of full and frequent doses of opium and of perfect quiet; but it is more fully stated in the article PERITONEUM.

126. XIII. THICKENING AND PERMANENT CONTRACTION OF A PORTION OF INTESTINE.—These lesions, whether consequent upon inflammation, or produced by constitutional vice, and impaired organic nervous power, have been fully described in the articles DIGESTIVE CANAL (§ 48. *et seq.*) and COLIC and ILEUS (§ 33.). In their slighter forms and earlier stages, they are not always, or even generally, attended by such symptoms as will enable the physician to form a correct idea of their nature, or to infer whether or not they are simply obstructive or, in addition, of a malignant character. In many cases, where this latter character exists, the malady is far advanced before the symptoms marking its nature become fully manifested; and in some it is even neither supposed nor detected until disclosed by an examination after death.

127. i. *Thickening and permanent Contraction* of the coats of a portion of intestine are usually conjoined. It is but rare that the one exists without the other. They are much more rarely observed in the small than in the large bowels. They are usually attended, in their early stages, by costiveness or by constipation, alternating with diarrhœa and colicky pains. The symptoms, however, vary according to the seat of a partial, or of a more or less complete, obstruction. (See COLIC and ILEUS, § 32. *et seq.*). When they are seated in the small intestines, vomiting frequently recurs with twisting pains, occasionally with a gurgling noise about the umbilicus, and the matters vomited are often more or less digested. When they implicate the ileo-cæcal valve, or the vicinity, pain is generally felt in the cæcal region; and if the obstruction be not complete, the fæcal matters which have passed into the large bowels, together with the decretions and excretions from their surface, generally form scanty and costive evacuations. When the obstruction is more complete, the sufferings of the patient are greater, the evacuations are scantier, and the bowel above the obstruction becomes more dilated and tympanitic, ultimately inflamed, and occasionally ulcerated, or even lacerated, or gangrened. In such cases, the abdominal tension, tenderness, and pain, the frequent small pulse, vomiting, &c., indicate the existence of inflammatory action; and the appearance of the vomited matters, and the seat or commencement of the suffering, suggest the portion of intestine affected. In most cases, the abdomen is very resonant on percussion; but if the obstruction be caused by much thickening of the coats of the intestine, there is marked dullness of sound on percussion in the situation of the part thus affected. The parts most liable to thickening and constriction of the coats, are the sigmoid flexure, and the arch of the colon. When this change exists low in the colon, the fits of vomiting are less frequent, and the evacuations at stool much scantier and less frequent, than when it is seated either in the small intestines, or at the commencement of the colon. Even when the disease is in the sigmoid flexure of the bowel, as much fæcal matter may pass into the rectum, as long as the canal is at all open, although remarkably constricted, as will form a consistent stool, by its accumulation and retention at the termination of the colon, and in the rectum. Thickening and permanent contraction in the small or large intestines, may be distinguished, with some probability, by the seat of pain and swelling, and of the gurgling noise caused by the passage of matters through the straitened part. If the contraction be in the colon, its situation may often be detected by observing how much fluid can be thrown up, and by consulting the feelings of the patient, whilst it is being thrown up, in addition to the other indications just noticed.

128. ii. When *scirrhus* or *carcinomatous* or *other malignant chronic disease* attacks the intestines, either primarily or consecutively (see DIGESTIVE CANAL, § 48. *et seq.*), it is generally attended not only by great thickening or hypertrophy of the coats, particularly of the sub-villous or cellular tissue, but also by very marked constriction of the canal. Tumours of various sizes, or fungous excrescences, sometimes sprout out from the diseased or ulcerated surface, which tend still further to lessen the aperture through the diseased part. The larger intestines, and particularly the cæcum, the ileo-cæcal valve, the sigmoid flexure of the colon, and still more the upper part of the rectum, are more frequently the seat of cancerous or malignant chronic disease than the small intestines.

129. iii. The *symptoms* of these changes are generally obscure, for they always come on imperceptibly and slowly. Distension of the bowels; more frequent calls to stool than usual, with difficulty and pain in passing the fæces; colicky pains, and stools consisting chiefly of frothy mucus, often tinged with blood, are amongst the earliest symptoms of the disease. The evacuations are only in small quantities at a time, are thinner than natural, and when consistent are much narrower, or mixed with a frothy or slimy mucus. Emaciation takes place, and the pulse becomes quick and feeble. As the disease proceeds, very acute lancinating pain is felt in some part of the abdomen, commonly the seat of lesion. When the patient is at stool, flatus passes through the diseased part, sometimes with a hissing sound and tremu-

lous motion. As the contraction increases, the quantity of fæces discharged is diminished, and abdominal distension, pain, and tension are increased. Occasional vomitings supervene, and become more and more frequent, the matters ejected being more digested or more nearly approach the fæculent appearance as the malady advances to a fatal termination. In some cases a distinct tumour may be felt, or its seat indicated by a dull sound and pain on percussion. I was lately consulted in a case of carcinoma, seated a little above the sigmoid flexure of the colon, which occurred in a medical man aged about 40, where the seat of the disease was thus indicated. The other circumstances also, already noticed, will further aid in forming an opinion as to the seat of mischief. The malady usually follows a slow but uninterrupted course, during which the swelling of the abdomen, pain, vomitings, and constipation increase. The countenance and general surface in this last stage commonly present the cachectic appearance usually observed in CANCER (§ 11.). At last inflammation, ulceration, or even rupture or gangrene, often takes place in the over-distended portion of bowel above the cancerous part, and the patient rapidly sinks; — syncope, cold sweats, singultus; feeble intermitting pulse; cold extremities, &c. ushering in dissolution: but the disease occasionally terminates in fatal exhaustion, without these alterations supervening, and without the symptoms of ileus taking place in a very violent form.

130. iv. Of the *treatment* of these changes but little can be said, more than will be found in the articles COLIC and ILEUS (§ 71. *et seq.*), and CONSTIPATION (§ 21.). I have seen temporary benefit derived in some cases, from small but frequent doses of Castile soap, ipecacuanha, and hyoscyamus; in others, from the purified extract of aloes, conjoined with the biborate of soda and conium. The frequent use of small quantities of sweet oil, so as to preserve the bowels in a freely open state, or the adoption of the oil instead of butter as an article of diet, has been of service in several instances. The injection of considerable quantities of it into the large bowels has also proved beneficial in the advanced states of the disease. A liniment consisting of the mercurial and compound camphor liniment with opium may be rubbed over the part of the abdomen chiefly affected, or the ammoniacal and mercurial plaster may be worn over this part. The *diet* should consist of such articles as are the least excrementitial or furnish the smallest proportion of fæcal matters.

131. XIV. SOFTENING OF THE VILLOUS MEMBRANE OF THE INTESTINES.— *Maladie Gastro-intestinale avec Désorganization Gélatiniforme*, CRUVEILHIER. — This lesion is fully described in the article DIGESTIVE CANAL (§ 34. *et seq.*). It occurs chiefly in infants and young children; and is distinct from the softening caused by inflammatory action. SOFTENING, as shown in that article, may be primary and idiopathic, and, in this form, is not unfrequently seated in the villous surface of the stomach and intestines, or of either more especially. It generally proceeds from causes which greatly depress the organic nervous power, and rarely takes place in adult persons, in whom, however, M. CRUVEILHIER, who first correctly described the disease, met with several instances. Of 50 cases observed by DR. ROMBERG, 6 occurred from the 1st to the 3rd month, inclusive; 17 from the 4th to the 6th month; 7 from the 7th to the 11th; 14 from the 12th to 24th month; and 6 from the 2d to the 5th year of age; the periods of weaning and teething being those during which it is most frequent.

132. i. *Symptoms.* The earliest indications of this disease are frequent, watery, greenish, slimy or mucous stools, often mixed with yellowish flakes, and having a peculiar offensive acid or putrid odour; occasional vomitings, of acid, ropy or mucous matters, and extreme thirst; acute sensibility, perpetual restlessness and fretfulness, and screaming or crying on being touched, or upon being roused from the state of exhaustion or of lethargy into which the infant generally sinks. Fever is observed at the commencement of some cases, but it is slight, and of short duration, and more commonly the skin is cool from the beginning. The surface becomes cool or soon cold, pale, flabby, and sickly, as the disease proceeds; and the countenance is also pale, cold, sickly and sunk. At an advanced stage there are a slight or short cough; remarkable exhaustion or sinking; a short or interrupted respiration; frequent crying and moaning; much apparent anxiety and restlessness; coldness of the extremities, with rapid emaciation and extreme debility; an irregular, languid, small and weak pulse; a white, pale, or slimy tongue; a soft, relaxed, sometimes inflated, but never a tender or painful state of the abdomen; and pale or whitish urine.

133. *The duration* of this malady varies from a few days to several weeks, or even to two or three months. When the patient is carried off more rapidly, disorder of a slighter form has existed for some time previously. When the disease proceeds unfavourably, a violent exacerbation, or a gradual exhaustion or sinking of the vital energy, usually terminates life. The sensorial functions, in these cases, are not oppressed by sanguineous congestion, or by aqueous effusion, but cease in consequence of the general vital depression and the extensive lesion of the intestinal canal.

134. ii. *Diagnosis.* If this disease have been ushered in with fever, it closely resembles, and indeed is intimately allied to, both in its symptoms and pathology, the CHOLERIC FEVER of infants. (See that article.) The greater severity of the attack, the presence of fever, and the more frequent vomiting and purging, are the chief symptoms which characterise this latter malady, and distinguish it from that now under consideration. The diarrhœa, the unoppressed state of the cerebral functions, the extreme irritability, fretfulness and restlessness, and the cerebral symptoms generally, fully distinguish this disease from inflammation of the brain or of its membranes, and from acute hydrocephalus.

135. iii. *Causes.* The *predisposing causes* are chiefly a weak or delicate development of the constitution, originally deficient vital energy, a poor or unhealthy state of the nurse's milk, and the numerous other causes lowering the powers of life in early infancy. The more common *exciting causes* are principally unwholesome, inappropriate, or insufficient food; weaning, or bringing up by hand, or premature weaning; and living in low, damp, or miasmatous localities, or in close, ill-ventilated, crowded apartments or cellars, or in

warm, damp, and low districts. I have seen this disease prevalent in low, humid, and miasmatous places, in warm countries, and within the tropics, particularly amongst the children of European parents. Many of the diseases of the infants or children of white parents residing in these countries, are more or less intimately related to this malady, especially whilst they continue to reside in them. M. Cruveilhier observed it to assume an epidemic form in some districts of France; and, when thus appearing, as well as when occurring sporadically, it is often *complicated* with softening of the villous coat of the stomach. When it proceeds from the state, quantity, or kind of food or other ingesta, it is generally thus associated; but, when it arises from the climate, air, and locality, it is frequently uncomplicated.

136. iv. *The structural change*, constituting this malady, is fully described in the article Digestive Canal (§ 34.). Dr. Droste considers that the softening process may be divided into *three stages:* — in the *first*, the villous surface preserves its appearance and texture, but loses its natural consistence, either in parts or patches, or more or less extensively. In the *second* stage, the villous membrane is converted into a thin, soft, gelatinous, and nearly transparent substance, which may be wiped off by a sponge from the adjoining tissue, or even washed off by a stream of water poured upon it; yet it seems still to be continuous with, or adherent to, the subjacent coats, which are also much softened. In the *third* stage, no trace of organization is left in any of the coats; the intestines being either perforated in various places, to a greater or less extent, or showing such perforations on being washed by a sponge or stream of water. It is obvious, that these stages are merely arbitrary divisions of the progressive advance of disorganization. As this malady consists of a loss of the vital cohesion of the coats of the intestines, it will obviously follow, that the capillary circulation will indicate, in these situations, some degree of congestion, or sanguineous exudations, in the form of ecchymoses and spots of extravasated blood. Softening may take place in any part of the alimentary canal. I have observed it most frequently in the stomach and ileum, and, as respects the latter, in the lower portion of it.

137. v. The *nature* of this change has been discussed by several continental pathologists, — and chiefly by Cruveilhier, Camerer, Andral, Droste, and Pommer; all of whom admit that softening of the intestinal villous membrane may be an idiopathic change, and independent of inflammation. Camerer, however, supposes that it proceeds from inflammation of the nerves supplying the intestinal canal, terminating in paralysis of them. From the history and phenomena of several cases which I have observed, as well as from the appearances after death, I believe that the softening here described depends upon innervation, or insufficient power, of the intestinal nerves, in consequence of which condition the villous surface first, and the other coats consecutively, lose their vital cohesion. This view is confirmed, moreover, by the effects of the remedies employed in cases manifesting the usual symptoms of the disease.

138. vi. *Treatment.*—The *causes* and *circumstances* connected with the production of the complaint should be ascertained and removed. The health of the nurse, and the state of her milk, ought to receive attention. If the infant be weaned, the diet must be duly regulated as to quantity and quality. Thirst, which is a general feature of the disease, should be allayed by frequent sippings, and never by full draughts. Asses' milk or milk and water or lime-water may be given often, but in small quantity; and if any additional food be allowed, it should be suited to the reduced state of digestive and assimilative power, and to the age of the patient. The medicines most appropriate to the disease are the preparations of *iron* and of *lime* and the more permanent and astringent vegetable *tonics*. Of the former, the *sulphate* and *muriate of iron* are the most serviceable, and of the latter the powdered *Cascarilla bark*. At the Infirmary for the Diseases of Children, I usually gave this bark with either of these salts in the form of powder, and very generally with the best results, when the patient came under the treatment in any of the earlier periods of the disease. This practice has been adopted in this Institution since my earliest connection with it (in 1820); and a similar treatment has been found successful in Germany by Drs. Pommer and Droste. In addition to these means, I have frequently prescribed warm salt-water bathing, and assiduous frictions, with stimulating liniments along the spine; and I have occasionally employed the *iodide of potassium* with advantage. An improvement in the pulse and other symptoms has often been observed on the second and third day after this course of treatment has been adopted. In this complaint, as in all others depending upon vital depression, particularly when occurring in large towns, and in other unhealthy localities, *change of air*, particularly to the sea-side, is a most important part of treatment; and, when aided by suitable diet and regimen, and by appropriate medicines, will generally remove the disease, if actual disorganization have not taken place.

Bibliog. and Refer. — *Fernelius*, Pathol. lib. vi. cap. ix. — *Tulpius*, Observ. Med. lib. iii. cap. 18. — *Horstius*, Decus Problematum de Morbo Intest. Mesent. et Omenti. Giess. 1609. — *V. de Petrone*, Duellum Literarium inter Medico-Salernitanos et Neapolitanos de Phlegmone Intestinorum. 4to. Venet. 1647. — *J. C. Peyer*, Ex Anat. Medica de Gland. Intestinorum, earumque Usu et Affectibus, 8vo. Schaffh. 1677. — *Amatus Lusitanus*, Cent. vii. cur. 93. — *G. E. Stahl*, De Intestinis, eorumque Morbis ac Symptomatibus cognoscendis et curandis, 4to. Halle, 1684. — *G. Thomasius*, Ephemer. Med. Phys. German. dec. iii. an. iii. obs. 190. p. 319. — *C. B. Behrens*, Ibid. dec. iii. an. v. et vi. obs. 34. p. 77. — *J. M. Hoffmann*, Ibid. dec. iii. ann. ix. et x. obs. 60. p. 124. — *E. Camerarius*, De Vitiis Machinæ Humanæ. Diss. iv. Tub. 1726. — *D. J. A. Fischer*, De Morbis Intestini Coli ex Anatomia dijudicandis. 4to. Erford, 1728. — *A. F. Walther*, De Intest. Angustia ex obfirmato eorum Habitûs Vitio. 4to. Leips. 1731. — *Morgagni*, De Sedibus et Causis Morb. Epist. xxxi. 19. xxxiv. et xxxv. — *Buechner*, De Spasmo Intest. 4to. Erf. 1741. — De Consensu Pedum cum Intestinis, 4to. Halle, 1747. — De Consensu Primarum Viarum cum Perimetro Corporis Humani, 4to. Halle, 1764. — *C. Leurinck*, De Morbis a Situ Intestin. Crassor. pendentibus. Gott. 1756. — *J. G. Bauer*, Epist. de Malis Intest. in *Halleri* Disp. Med. t. iii. p. 461. — *C. F. Kaltschmidt*. in *Halleri* Disp. Med. t. iii. No. 99. — *C. G. Ludwig*, in *Schlegel*. Thesaur. Semeiot. t. ii. No. 8. — *J. Quarin*, Method. Medendi Inflammationes, 8vo. Vien. 1774. — *Stoll*. Rat. Med. vol. i. p. 262. et vol. iv. p. 71. — *Percival*, Mem. of Med. Society of Lond. vol. ii. p. 60. — *W. Dougall*, Edin. Med. Comment. vol. ix. — *A. S. Nevinson*, Observ. on the Use of Crude Mercury in Obstruct. of the Bowels, and on Castor Oil. 8vo. New. 1787. — *W. Stark*, Works consisting of Chemical and Anatomical Observations, 4to. Lond. 1788. — *G. F. Hildebrandt*, Geschichte der Unreinigkeiten im Magen und in den Gedarmen. 8vo. Brunow. 1790. — *W. Henning*, Beschriebung von der Entzündung des Magens und der Gedärme, 8vo. Copenhag. 1795. — *B. Vogel*, Methode den Ileus von Eingekkemmten Durmbruchen zu Heilen. 8vo. Nurnb. 1797. — *F. Duncan*, Letter on a Particular Affection of the Bowels in the East Indies. 8vo. Lond. 1801. — *E. Peart*, Practical In-

formation on Inflammation of the Bowels, 8vo. Lond. 1802. — *J. Sanden*, in Annals of Med. vol. vi. p. 293. *J. A. Gaitskell*, Essay on Catarrhal Inflamm. of the Bowels from Cold. 8vo. Lond. 1812. — *F. J. V. Broussais*, Histoire des Phlegmasies Chroniques, 8vo. Paris, 1807. 2 vols.; 3d edit. 1822, 3 vols. sect. ii. Inflam. des Viscères de l'Abdomen. — *Petit et Serres*, Traité de la Fièvre Entero-Mesenterique, 8vo. Paris, 1813. — *Renauldin*, Dict. des Sc. Méd. t. xii. — *Portal*, Mém. sur Plus. Malad. t. v. p. 51. — *Spangenberg*, in *Horn's* Archiv. 1812, p. 452. — *A. T. Sue*, Aperçu sur les Pneumatoses Intestinales. Paris, 1816. — *A. Monro*, The Morbid Anatomy of the Gullet, Stomach, and Intestines, 8vo. Edin. 1811.; 2d edit. 1830. — *C. R. Pemberton*, A Practical Treatise on Diseases of the Abdominal Viscera, 8vo. Lond. 1814. — *Powell*, In Med. Transactions of College of Physicians, 8vo. vol. vi. — *J. Cruveilhier*, Méd. Pratique éclairée par l'Anatomie et la Phys. Patholog. cahier 1. 8vo. Paris, 1824. — *Chomel*, Dict. de Médecine, t. viii. — *J. F. Meckel*, Journ. Complem. du Dict. des Sciences Médicales, t. iii. p. 125. — *J. J. Lassere*, Journ. Univers. des Sc. Méd. t. xviii. p. 257. — *Louis*, Archives Génér. de Médecine, t. i. p. 17.; et Mém. sur Plus. Malad. 8vo. Paris, 1826, p. 136.; et Recherches sur Gastro-Entérite, &c. 8vo. Paris, 1829, 2 vols. — *Andral*, in Nouv. Journ. de Méd. t. xv. p. 193.; et Méd. Clinique, t. iv. et v.; et Anatom. Pathol. 8vo. Paris, 1829; et Cours de Pathol. Interne. Paris, 1836, 3 vols. vol. i. — *Trolliet*, in Archives Gén. de Méd. t. ix. — *Goldmann*, in Archives Gén. de Méd. t. i. p. 278. — *Legallois*, Ibid. t. vi. p. 68. — *Denis*, Ibid. t. xvii. p. 111. — *Fuschius*, Ibid. t. ix. p. 116. — *Louis*, Ibid. t. xiv. p. 185. — *Buet*, Ibid. t. xiv. p. 230. — *Rostan*, Ibid. t. xix. p. 332. — *Corbin*, in Ibid. t. xxiv. p. 214., et t. xxv. p. 36. — *Trousseau*, in Ibid. Jan. et Fev. 1826. — *Bretonneau*, in Ibid. Sept. 1829. — *Leuret*, In Ibid. Oct. 1828. — *Gendron*, Ibid. Juin et Jul. 1829. — *Toulmouche*, Ibid. Mai, 1830. — *J. Abercrombie*, Pathol. and Practical Researches on Dis. of the Stomach, the Intestinal Canal, the Liver, and other Viscera of the Abdomen. 8vo. Edinb. 1828, 3d. ed. 1837. — *Camerer*, Versuche ueber die Natur der Krankhaften Magenerweichung, &c. 8vo. Stuttg. 1828. — *J. Johnson*, On Morbid Sensibility of the Stomach and Bowels, &c. 8vo, Lond. 1828, and Med. Chirurg. Review, vol. ii. p. 4. — *J. Armstrong*, The Morbid Anatomy of the Bowels, Liver, and Stomach, 4to. Lond. 1828. — *A. Bompard*, Traité des Maladies des Voies Digestives, 8vo. Paris, 1829. — *Roche*, Dict. de Méd. Prat. t. vii. — *Billard*, In Edinb. Med. and Surg. Journ. vol. xxviii. p. 163. — *Lesser*, Entzündung und Verschwarung der Verdanngs organe. Berlin, 1830. — *Cloquet*, Nouv. Journ. de Méd. t. i. et Lond. Med. Repos. vol. x. p. 332. — *Schmidtmann*, Observ. Medicin. t. ii. p. 98. 181. — *Mollison*, Transact. of Edinb. Med. and Chirurg. Soc. vol. ii. p. 249. — *Droste*, In British and Foreign Med. Review, vol. ii. p. 551. — *Gendrin*, Hist. Anat. des Inflam. 8vo. Paris, 1826, vol. i. — *Hutin*, Biblioth. Méd. Juil., Sept., et Nov. 1826. — *Scoutetten*, in Journ. Complem. du Dict. des Sc. Méd. 1827 et 1828. — *J. O. Beirne*, New Views on the Process of Defæcation, and their Applicat. to the Pathol. and Treat. of Dis. of the Stomach, Bowels, &c. 8vo. Dublin, 1833. — *C. B. Chardon*, Pathol. de l'Estomac, des Intestines, et du Péritoine, 8vo. Paris, 1833, 2 vols. — *W. Thomson*, Edin. Medical and Surgical Journ. vol. xlvi. p. 102. — *W. Stokes*, Cyclop. of Pract. Med. vol. ii. p. 54.; and Lond. Med. and Surg. Journ. vol. v. p. 70. — *Griffin*, Dublin Med. Journ. vol. vi. p. 384. — *R. J. Evanson*, and *H. Maunsell*, A Practical Treatise on the Diseases of Children, 8vo. Dubl. 1836, p. 233. — *Cruveilhier*, Anat. Pathol. du Corps Humain. fol. fascic. iv. vii. xiv. Paris, 1837. — *J. Bouillaud*, Clinique Médicale, 8vo. Paris, 1837, 3 tomes. — *F. Hodgkin*, Lectures on the Morbid Anatomy of the Serous and Mucous Membranes, 8vo. Lond. 1838. 1840., 2 vols. vol. ii. passim. (See also Bibliog. and Refer. to articles Colic and Ileus, Constipation, Diarrhœa, and Digestive Canal.

INTUS-SUSCEPTION. — *See* art. Colic and Ileus, § 38.

IRITIS. — *See* art. Eye.

IRRITABILITY. — Synon. *Irritabilitas; vis irritabilitatis; vis insita*, Haller. *Vis vitalis*, Görter. *Irritabilité*, Fr. *Die irritabilität*, *Reizbarkeit*, Germ. *Inherent power*, *Myotility*, *Muscular Power*, *Contractility*, *Muscular Contractility*, *Excitability*, &c. of various authors.

Classif. — General Pathology.

1. Defin. — *A power or property of organized bodies of being acted upon by stimuli, so as to give rise to movements, manifested chiefly by muscular or fibrous tissues.*

2. This very important and generally diffused property of animal bodies was first investigated by Dr. Glisson. He applied the term "*irritability*" to all *the sensible and insensible movements of animals*. Baglivi, Görter, Winter, and Hoffmann used this term in nearly a similar manner to Glisson, and it was thus commonly employed until Haller restricted it to *the susceptibility of movement in muscular tissues*, and carefully investigated its laws in those parts. In this latter sense it was employed by physiologists, until Girtanner rejected the restricted sense of Haller, and used it in the comprehensive sense adopted by Glisson.

3. i. *Of the Source of Irritability.* — The source of this property soon became a subject of discussion. Most physicians recognised it as a manifestation of life in organised bodies; but the circumstance of its being called into activity by nervous influence readily suggested the question as to its dependence upon, or independence of, this influence. Haller and his disciples, with Fontana, Metzger, Bichat and others, considered irritability to be, *sui generis*, inherent in the muscular fibre, altogether independent of nervous influence, and only subjected, in muscles governed by the will, to the action of the nerves, which in this case serve as conductors of the stimulus intended to excite contraction. They founded their opinion on the facts, that muscular power is altogether different from the power of living nerves in its manifestations, the former consisting of visible oscillations and movements not perceivable in nerves,—and that destruction of the brain and spinal chord, or division of the voluntary nerves supplying the muscles, does not annihilate the power of muscular movement, when subjected to irritation. On the other hand, Whytt, Monro, Unzer, Prochaska, Legallois, &c. regarded the nervous power as the principle upon which all muscular contractions depend, and consequently irritability to be communicated to the muscles by the nerves, — because nerves enter into the composition of all muscles; because the latter contract quite as well when the former are irritated, as when the stimulus is applied to the muscles themselves; because irritability is extinguished by substances subversive of nervous power; and because the destruction of the brain and spinal chord, and section or ligature of the nerves, cause the disappearance of the power of contraction on applying irritants to the muscles. It is obvious, as Tiedemann has remarked, that both parties have pushed their arguments too far, and, indeed, have over-stated or exaggerated the facts from which they argue. Haller and his disciples were wrong, and went counter to every idea of an organised body, in which all the manifestations of life are mutually connected, in attributing to the muscles a faculty altogether independent of the influence of the nervous system. But his opponents were equally wrong in attaching too great an importance to the part which the cerebro-spinal nervous system performs in the phenomena of muscular contractility.

4. In the year 1820, and subsequently (see *Lond. Med. Repository, for May,* 1822, *and my Notes and Appendix to Richerand's Elements of Physiology, &c.* edit. 1824, 2d edit. 1829, p. 690.), I showed, as the result of my researches into this subject, that irritability is not dependent upon the cerebro-spinal nervous system, although it is ex-

cited by this system; but that it proceeds from the organic or ganglial system of nerves* — that this latter system bestows on muscular or fibrous tissues the power of contraction, whilst the spinal nerves simply conduct or convey the stimuli to contraction. This statement, with the proofs and arguments in its favour, appeared at the time just stated; and in 1835 — fifteen years subsequently — Dr. Fletcher published lectures (*in Lond. Med. and Surg. Journ.*, vol. vii. p. 327. *et seq.*), in which not only the same statement, but also the identical proofs and arguments, which had been urged by me in the works above referred to, were adduced by him as his own original views, and in some parts in nearly the same words as I had there employed. In the republication, however, of these lectures, and in a different form, some reference was made to the originator of these views, but in such a manner as showed that the act was one of compulsion rather than of inclination.

5. As expressed in my published notes on this subject, and on others connected with it, I have suggested that the different departments of the nervous system have been hitherto viewed in a much too restricted manner; and that, instead of considering the different orders of nerves as ramifications shooting forth from the large nervous masses, it would be equally, if not more, correct, and consistent with the gradual rise in the scale of animal creation, and with the development of the tissues and organs in the higher animals, to view them as originating in the different structures and organs in which they have hitherto been said to terminate.† The reasons which I assigned for this mode of investigation, and for adopting it in addition to the one-sided mode of viewing this subject hitherto pursued, need not be here repeated. I may, however, briefly state, that the lowest grades of animal bodies, and the earliest stage of animal formation, display merely minute granulated or nucleated globules or corpuscles, more or less abundantly disseminated throughout the cellular and other tissues; and that, as these tissues are more visibly developed, and assume a more truly cellular and fibrous conformation, from the almost albuminous state of the earlier stage of their formation, so the grey fibres constituting the organic nervous ramifications become visible in connection with these corpuscles. In the fully developed state of animal organisation these granulated corpuscles are numerous and demonstrable in the tissues, parti-

---

* As respects the more perfect manifestations of this property, by means of muscular structures, I there stated, “that, as irritability is present in parts which do not receive voluntary nerves, this faculty cannot be attributed to them. To what other species of organisation can we refer it? We observe it, in the more perfect animals, displayed chiefly by muscular parts. Is it from this circumstance an attribute only of muscular parts, and the pure result of their conformation? One class of physiologists answers this question in the affirmative. But irritability is manifested in the lowest orders of the animal creation, as well as in some of the higher, by parts in which a muscular structure cannot be detected; therefore, although a property of the muscular structure, it is neither altogether restricted to it, nor is it strictly the result of the organisation of this structure, independently of some other. Consequently this property must be referred to a conformation still more general than the muscular tissue, as respects both the entire scale of animal creation, and the organisation of individual species; allowing, at the same time, that a particular structure is requisite to the full and perfect manifestation of this property, but that this structure depends upon a different source than itself for the property which it displays.

“Having arrived at the conclusion, that irritability, although a property of muscular parts, is not the result of muscular organisation merely, but is derived from a different and more general system, supplying the muscular structure as well as other structures, we must next inquire what this system is. It has been already shown that the organic or ganglial nervous system is distributed in various proportions to all the textures and organs of the body; that this system is similarly distributed throughout all the individuals composing the animal kingdom; that in some animals it is the chief nervous system; that not only is it present wherever irritability is manifested, but it is the most generally diffused of all the tissues; that no other structure than this exists which can be shown to be present in every species of irritable or contractile parts, in all orders of animals; and, consequently, that to no other source than this can irritability be assigned.

“Having inferred that the muscular fibre is only the instrument of contraction in its more perfect condition, — that it performs the function in consequence of a certain conformation, and owing to that conformation being endowed by another still more generally diffused than itself, — and that this property is derived from the ganglial, or soft nervous system, — we are led further to infer that the cerebro-spinal nerves are distributed to muscular parts for specific purposes, but that these parts do not derive their innate properties from these latter nerves — these nerves merely exciting them, or acting as conductors of a stimulus to properties which proceed from a different source. I have contended that these properties are not innate, or the consequence of the conformation of the muscular fibre itself; but are derived from a conformation more general, surrounding or otherwise connected with the muscular fibriles, and that this more general conformation is the organic nervous system. Conceiving, therefore, that this system, in its state of ultimate distribution and dissemination in the texture of a muscle, whether in the form of unarranged corpuscles, or of minute and variously arranged fibriles resulting from the regular distribution of these corpuscles, is the chief source of the property evinced by muscular parts of every denomination, I further conclude that the cerebro-spinal nerves do not produce their specific effects on muscular fibres, owing to a nervous fibrile being ramified to each muscular fibrile, for this does not take place; nor do these effects proceed from the direct influence of these nerves upon the muscular fibrile, for the muscular fibre has been shown to derive its property or faculty of contraction from a source different from itself and from the voluntary nerves which occasionally excite its contractions; but that these nerves seem to act directly upon the ultimate distribution or corpuscles of the organic nervous system in the muscle, which system bestows on it the faculty of, or disposition to, active contraction, on the application of a stimulus; and this faculty all muscular parts possess, although some of these parts only are supplied with voluntary nerves, and are liable to be acted upon by cerebro-spinal influence. The mode of termination of voluntary nerves in muscular parts also favours the opinion now stated. These nerves terminate, as already noticed, in such a manner as leads me to infer, that they become, in the textures which they supply, gradually identified, as it were, or amalgamated, with the ultimate distributions of the ganglial nerves; and the history of the embryo and the progressive development of the nervous system in the lower animals lead me to believe that the voluntary nerves originate in the textures which they supply; that they proceed from the ganglial system; and that their larger branches, the spinal marrow, and encephalon are successively formed.”

† “Viewing the nervous system throughout the numerous classes of animals, and tracing the process of its formation from the embryo up to the period of perfect fœtal existence in the higher animals, I am led to infer that this system is not originally formed from the centre towards the circumference, but that the origin of its ramifications commences in the mucous or cellular tissues, when the embryo is yet but in an apparently homogeneous state; and that as the textures become, in the process of fœtal growth, more and more developed, so the corpuscles composing the rudimental nervous system, and chiefly those of the ganglial system of nerves, are arranged into chords of communication, chiefly in the course of the vessels, for the purpose of preserving a connection between the organs, and reinforcing each of the textures with the influence which those systems generate in their perfect states of development. As the embryo is formed, the nervous ramifications advance towards centres, which vary in their characters according to the genus of the animal: in those which are more perfect those centres are numerous, and almost each differs more or less sensibly from the other, both as to appearance and function.” — See *Author's Notes, &c. to* M. Richerand's *Elements of Physiology*, &c., p. 1.

cularly in the ganglions in connection with the grey organic fibres, and in the muscular fibriles, both involuntary and voluntary. But, whether these corpuscles are formed before the large nervous masses connected with sensation, volition, &c. or contemporaneously with these masses, is of little consequence. The most important question is — What is the function performed by these corpuscles? When we recollect that these bodies are found disseminated through the albuminous and otherwise almost inorganised structure of polypi, and throughout the tissues of others of the lowest animals, which manifest irritability as their most important function, and when we know that these animals are capable of being multiplied by division, and that parts cut off from them have separate existences, it seems highly probable that the vital functions they display — that irritability proceeds from this peculiar organisation. Having further observed these granulated corpuscles disseminated through other tissues, in an abundance proportionate to the amount or grade of vital function — having detected these corpuscles in great numbers within the delicate membrane investing the primitive fasciculi of voluntary muscular fibriles, and in the flattened fibriles of involuntary muscular parts, — having seen still greater numbers of them comprised in the structure of the organic nervous fibres, and constituting the chief part of the ganglia, — and having moreover found them giving origin to the grey and solid filaments of organic nerves, as well as comprised in or embraced by these filaments, it may be inferred that they are mainly concerned in the production of the various grades of irritability or contractility manifested by the tissues in which they[*] are thus disseminated, and to which they are thus supplied.

6. The views which I published in 1820, 1824 and 1829, respecting the constitution, connections, and functions of the organic or ganglial nervous system, have been more recently (from 1831 till 1840) confirmed by the researches of Retzius, Giltay, Müller, and Valentin. The organic, or grey nerves, do not consist, as the motor and sensitive nerves of the spino-cerebral axis do, of parallel tubes containing a liquid matter; but are altogether homogeneous, pale, almost transparent, and peculiar in their form, distribution, and connections. They are intimately connected with the granulated or nucleated corpuscles disseminated throughout the tissues, and they either enclose, or are otherwise associated with, these corpuscles or globules in great numbers, both in the ganglia and in the plexuses and ramifications. The grey, or ganglial nerves, thus seem to arise from the organic globules just described, especially from those contained in the ganglia. The ganglia should therefore be regarded as the central organs of the organic nervous system; and the white fibres which run to and through them, especially in the lateral chords of sympathetic ganglia, without having any intimate connection with the granulated corpuscles of the ganglia, and merely passing between these corpuscles, are the sensitive and motor fibres of the nerves derived from the cerebrum and spinal chord. The organic, or grey portions of the nervous system, and more especially of those parts of it lodged in the abdominal, thoracic, and cervical regions, preside over the organic and truly vital functions; and their connections with the cerebro-spinal centres are such as evidently show that they are ramified thither in order to endow these centres with the organic nervous power in common with other parts of the œconomy; nerves proceeding from these centres also being ramified to the ganglia to supply them with the sensitive and motor influences. The nervous connections or ramifications between the ganglia and cerebro-spinal axis thus consist of the solid or homogeneous grey fibres of organic nerves conveying the strictly vital or vegetative influence to the brain and spinal chord, and of the whitish tubular fibres of motor and sensitive nerves transmitting the influence of these organs in various degrees to the viscera engaged in the strictly vital operations. In those parts which perform complex functions, as the organs constituting the face, mouth, throat, &c., and the organs of generation, which are endowed with the functions of secretion, sensation, and motion, the nerves proceeding thither consist both of the grey fibres of organic life, and the white tubular fibres of sensitive and motor nerves.

7. From what has been here stated, — from the most recent researches, — and from the conformation detected by microscopic observation, the results of my own investigations many years since, as published in the works already referred to, have been fully confirmed, namely, that the organic or ganglial nervous system presides over the strictly vital functions, and that all the grades and manifestations of irritability or contractility proceed from this source. It is extremely probable that the organic or nucleated corpuscles disseminated throughout the structures, and particularly in fibrous and contractile parts, bestow a certain share or grade of contractility upon them, and that an additional or even a principal share of this property is contributed by the ganglia and organic nerves distributed to them. Indeed this is shown by numerous observations made by me in 1812 and 1813, when it was proved that the hearts of fishes continued to contract for a considerable time after they were removed from the animals, and from all the nervous structures external to themselves; whilst influence of the ganglia on the involuntary muscles was proved by the application of powerful stimuli to the cœliac ganglion having caused increased peristaltic movements of the intestines that continued for some time. (See a notice of these experiments in my "*Notes*," &c., already referred to.)

8. In the organic muscles, which possess either a power of almost continued action, or a certain rhythm of action, as the heart and alimentary canal, the organic nerves are plentifully distributed, and abound with the organic corpuscles above described; showing that the unexhausted irritability of these parts is chiefly owing to this organisation. The facts and arguments adduced so many years since by me, in proof of the dependence of irritability upon the organic nervous system, have been very recently urged with little variation by Dr. Fletcher and by several German

---

[*] Schwann and more recent microscopic observers and physiological writers, both foreign and British, suppose that these granulated corpuscles are merely the nuclei of the cells from which, according to him, all the tissues are developed. That this, however, is not the case, and that these corpuscles are intimately connected with the performance of important functions, are shown by their higher and more complex organisation, and by the circumstances of their constituting the principl part of the composition of the ganglia and of the organic nerves. I would therefore denominate them the *organic corpuscles*.

writers; but what they have advanced merely confirms what I had published, fully explained, and made even the basis of a system of general and special pathology, many years previously, in the works above stated. Amongst others, the subjoined remarks[*] of MUELLER, from the able translation of his Elements of Physiology, by Dr. BALY, may be adduced in illustration of what I had stated long since respecting the functions of the organic or ganglial nervous system, and the source of irritability. After stating the same facts as have been advanced by me, he draws the same inference, namely, "that the organic nerves distributed in the muscular substance have a principal share in the production of their automatic movements, and that the rhythmic contractions of the organic muscles are not independent of the nerves, as HALLER believed." (P. 913.) — The error of those who contended that irritability was independent of nervous influence, arose from the circumstance of their confounding the cerebro-spinal nervous influence, or sensitive and motive function, with organic nervous power, or the strictly vital manifestations. HALLER, believing that there was only one species of nervous influence, and that it proceeded from the brain, considered the irritability of muscular parts to be what it really is, independent of this part of the nervous system; but his arguments and facts left entirely unaffected, or rather confirmed, the view, first advanced and supported by me, that this property of animal bodies proceeds from the organic nervous system, which system I showed to be altogether distinct from the cerebro-spinal nervous system, its functions being different from those of the other system, and altogether of a strictly vital character.[†]

9. From what has been now stated, it will be inferred that *irritability*, according to the sense in which it has been viewed by HALLER and others, is the contractility, or power of contraction, possessed by muscular parts, and displayed by them when acted upon by stimuli or irritants. In the wider sense of the word, according to GLISSON and others, it is the power of sensible and insensible contraction possessed by most living tissues. The molecules of matter composing the living structures are preserved in a state of cohesion, varying in grade in the different tissues. This variation in grade depends upon the organization of the tissue, and upon the state of its vital endowment. That the organization affects the cohesion of a particular structure, does not require proof; and that the state of vitality exerts a marked influence upon the cohesion of the tissues generally, is shown by the gradual loss of cohesion as vitality departs, and as it becomes reduced in the progress of diseases characterised by exhaustion. The state of the blood also affects the cohesion of the structures, but most probably by first reducing vital power. From this intimate dependence of structural cohesion upon vitality, the term *vital cohesion* of the tissues may be used with reference to some of the most important conditions presented by them in health and in disease. As the powers of life are perfect and strongly manifested, so cohesion is perfect, and, as these powers are reduced, so it also is reduced: hence it becomes an index in many diseases of the degree to which this reduction has taken place; the firmness and tenacity of the tissues, and the duration of these properties for a time after death, varying with the reduction of vital energy.

10. ii. *Of the Grades of Irritability.* — The *vital cohesion* of the tissues is one of the earliest, the most generally diffused, the lowest, and the most persistent of vital phenomena. It furnishes as it were, the basis for all the other manifestations of life; and as it becomes weakened, or ceases, these manifestations more or less completely disappear. As long as the tissues are endowed with life, vital cohesion continues, varying however in grade with the circumstances just stated. Of the parts possessed of vital cohesion, a very large proportion present certain grades and modes of *contractility* which have been variously denominated. Contractility is essentially a vital phenomenon, and results from changes in the vital endowment of a structure affecting the relative position of the molecules composing such structure. *Vital contractility* may be divided into grades, commencing with the lowest and the most generally diffused grade of this property of living parts — with that grade the next above simple vital cohesion, in the scale of animal manifestations.

11. 1st. *Insensible organic contractility*, or that state usually denominated *tone or tonicity*, is, like *vital cohesion*, not confined to the animal kingdom: it is a property of vegetables and of animals not possessed of a heart. It is diffused throughout the tissues, and may be viewed as merely a higher grade of *vital cohesion*, or rather this latter may be considered as the lowest manifestation of life in organic structures, insensible organic contractility or tone being the next in the scale. This property, equally with the preceding, results from the vital influence with which the structures are endowed, — is perfect, as this influence is perfect, is impaired as it is weakened, and altogether disappears soon after life has departed. Insensible contractility or tone is manifested by the vascular system more especially, and by the soft solids generally; and it is more or less exerted in all the vital operations — in the circulation, in secretion, in nutrition, and

---

[*] "It has been proved that the automatic movements of the organic muscles, like all muscular motion, depend primarily on the influence of the nervous principle; that the cause of the rhythm of these automatic motions is not connected with the nature of the muscular fibres, but with the peculiarity of the nervous system of the organic muscles: and that the cœliac ganglion has the property of exciting, when irritated, the peristaltic motions of the intestines. It appears, moreover, that the sympathetic nerve retains its ganglionic structure even in its more minute ramifications; and the power of the intestine to perform its peristaltic motions is found to be preserved even when it is separated from the mesentery. From these facts, then, I conclude, that even the minute branches of the sympathetic which ramify in the intestinal coats, have the same power of causing periodic contractions as the cœliac ganglion was proved to possess. The explanation which applies to the peristaltic movements of the intestines has the same force with relation to the rhythmic motion of the heart, the first observed motion of which, in its simple tubular condition, is indeed of a peristaltic nature. Since, therefore, not merely the larger ganglions of the sympathetic, but even its ultimate ramifications in the tissues of organs seem to possess the power of giving rise to periodic motions, we can understand how the rhythmic movements of the heart, intestine, and oviduct of the turtle, are enabled to continue when these organs are removed from their connections in the body." — *Mueller's Physiology*, by *Baly*, p. 914.

[†] On this subject the reader is referred to the *London Medical Repository*, vol. xvii. p. 370. *et seq.*: and to the Author's Notes and Appendix to M. RICHERAND's *Elements of Physiology*, where will be found the same facts and opinions stated as early as 1820, 1822, and 1824, as have been espoused by MÜLLER, and others much more recently.

in absorption; the perfection of these functions depending upon its due manifestation. The organic nervous system seems to be instrumental in its production and preservation in the animal kingdom, as I have contended in the works already referred to.

12. 2dly. *Sensible organic contractility, or irritability*, is that property of contraction which exists in fibrous and muscular parts. It is excited by the application of an irritant or stimulant; and depends, as I have shown above (§4. *et seq.*), upon the ultimate organization and distribution of the organic or ganglial nervous substance or corpuscles to these parts.

13. Both these species of organic contractility result from one species of influence with which animal bodies are endowed — they are the proximate results of vitality, and differ from each other, owing to the intimate structure of the parts in which they are seated, and to the extent to which each of the parts manifesting these properties is supplied with the organic nervous globules and ganglial ramifications.

14. 3dly. *Cerebro-spinal Contractility* is the contraction of those muscles which is occasioned by volition, and by stimulants acting upon their motive and sensitive nerves. It takes place only in such muscles as receive nerves from the spinal chord, medulla oblongata, and encephalon; and results from this conformation and connection with these centres of volition and sensation. Although produced and directed by volition, it may also be excited by irritations acting upon, or conveyed to, the cerebro-spinal axis, or the nerves proceeding from any part of this axis.

15. The *first* and *second species* of contractility proceed from the organic nervous system and influence, the *third* from the super-addition of the nerves of voluntary motion and of sensation. This last form of contractility, however, may take place in voluntary muscles, independently of *volition*, by a "*reflex sympathy*," as shown by me in the places already referred to[*]: and independently also of *sensation*, as subsequently contended for by Dr. M. Hall, by means of what he has denominated a "*reflex function*" with which he supposes the spinal chord to be endowed.

16. As the various grades of contractility are dependent upon vital energy, and as the higher grades of it are influenced moreover by the states of the nervous systems—sensible organic contractility, by the organic nervous system; and cerebro-spinal contractility by the cerebro-spinal system — so it must necessarily follow, that they will vary in their grades and conditions with the vital manifestations generally, and with those more particularly evinced by these systems. Hence irritability may be impaired or exalted, either throughout the frame, or in one or more tissues or parts. Irritable structures, moreover, are not only liable to alterations in the grades of action, but they also evince a greater or less disposition to be acted upon by the ordinary stimuli. The susceptibility of irritation as well as the degrees to which the consequent contraction takes place in living structures, vary in different constitutions and temperaments, and in different diseases, and even in the same disease, owing to various circumstances connected with diathesis and habit of body, and with the nature of the exciting causes.

17. iii. *Conditions requisite to the healthy manifestation of the several grades of irritability.* From what has been stated, it is obvious that these manifestations will be perfect according as the vital endowment is perfect. That form of contractility, with which the involuntary muscles are endowed, being altogether dependent upon the ganglial nervous system, will necessarily be influenced by the conditions of this system; and that which is displayed by voluntary muscles will vary, according to the states of the cerebro-spinal axis and nerves, chiefly in respect of the degree in which these muscles will still continue subjected to the influence of volition; injury or destruction of these parts of the nervous system leaving the voluntary muscles still possessed of their contractility, although in a more or less impaired form, owing to the loss of an accustomed stimulus to contraction; and as I have stated many years ago in my physiological notes, it is reasonable to suppose, "that the voluntary nerves convey to the organic or vital nerves a natural stimulus or influence; and that, if the latter nerves were deprived of this additional influence, the parts supplied with them would necessarily suffer an impairment of function."

18. *A.* A strong proof *of the influence of the nervous systems upon irritability* is furnished by the operation of these agents, which either exhaust, or directly depress, the nervous power. Galvanism, electricity, mechanical irritation, &c., exhaust this property, and narcotics destroy it, or at least greatly impair it. These effects are produced upon both voluntary and involuntary muscles, and whether the agents be applied to the muscular tissue directly, or to the nerves distributed to them. In the former case, they affect chiefly the organic corpuscles or vital nerves actuating the muscular structure; in the latter, they produce a nearly similar effect through the medium of the voluntary nerves terminating in it. Many of the exciting causes of disease, and the majority of our medicinal agents, produce these effects in a similar manner; the several manifestations of contractility being thereby impaired, exalted, or exhausted, or specifically modified, according to the natures or properties of such causes and agents. From what has been stated, as well as from obvious phenomena coming under the cognizance of every observer, it may be inferred, that the several grades of irritability of this property, viewed in the sense entertained by Glisson, are the most general and important of the several endowments of life, and the most requisite to the continuance of life. I have also stated, and more fully attempted to show many years since, that this property results from a peculiar organization —from the distribution of the organic or vital nervous fibriles and corpuscles to the tissues displaying this property: and that the apparent dependence of it, in voluntary muscles, upon the

---

[*] See also several *articles* in the first volume of this work, which were published twelve months before the appearance of Dr. M. Hall's views. In these articles (p. 322. § 23., p. 331. § 16., p. 424. § 46., and p. 576. § 81.) I have accounted for the occurrence of involuntary movements, contractions, and spasms in voluntary muscles, in several diseases, by showing that they proceed from irritation propagated to the roots of the spinal nerves, or to the spinal chord itself, and thence reflected, by means of the spinal nerves, upon the voluntary muscles. (See articles Cholera, Chorea, &c., Convulsions, Disease, Epilepsy, and Irritation, at the *sections* just referred to.)

cerebro-spinal nervous system, is owing to the termination of motor nerves in these muscles, in order to bring them under the influence of volition; the high grade of irritability which they possess being, however, derived from the organic or vital nervous system; and probably, also, reinforced by the influence proceeding from the spinal chord.[*]

19. It follows from the foregoing, that whilst the several manifestations of irritability are all directly dependent upon the organic or vital nervous system, — are expressions of life through the medium of this system, — one form only of this property, namely, voluntary motion, is unequivocally influenced by the cerebro-spinal nervous system; this form, however, being chiefly derived from the former source, although excited and directed by the latter. Moreover, it may be inferred that these manifestations being dependent upon this source, the several changes to which they are subject chiefly proceed from changes in the condition of the organic or vital nervous energy; and that alterations of that form of this property which is more intimately connected with volition, equally with the other forms, also proceed from the same source; a healthy state of the cerebro-spinal nervous system, and of its ramifications, being requisite to the due excitement, direction, and determination, of this particular manifestation of irritability. These influences, indeed, are daily illustrated by the phenomena of disease, more particularly of those diseases which implicate the vital endowments manifested through the medium of the ganglial or vital nervous system, or which affect the integrity of the cerebro-spinal system. In the former class of these diseases, the irritability of vital organs is affected co-ordinately with the disorder experienced by the ganglial system; and that of voluntary organs is also either imperfectly manifested, or incapable of being determined or directed. In the latter class, on the other hand, the organic nervous system is entirely unaffected, its functions being quite healthy, and irritability also perfect throughout the frame; yet, owing to lesion in some part of the cerebro-spinal system, the contractions of voluntary muscles are either not excited, or not directed, or uncontrolled, although the power derived from the ganglial system still continues to be possessed by them.

20. *B.* The *influence of the blood upon the irritability of parts* is demonstrable. Stenson, Arnemann, Bichat, Emmert, Segalas, and others have proved this influence; and shown, that the presence of blood in irritable textures is necessary to the continuance, even for a short time, of the property of contraction; and that the power of volition over voluntary muscles is lost when blood is no longer sent to them. It is also fully proved, that arterial blood is requisite to the due performance of the several grades of contractility; and that, whilst the continued action of this blood on irritable parts is necessary to their functions, this blood loses something by this action, or undergoes changes in the course of it, that give this fluid the venous character. That venous blood is incapable of supporting irritability in its healthy and more persistent states, is shown by the blue disease, and by the several modes of producing asphyxia. The state of the blood, in respect also of the presence in it of either stimulating, depressing, narcotic or specifically alterative, materials, has also a most important effect upon the several forms of irritability. Many of the causes of disease, many remedies, and many poisons, act upon the frame by passing into the circulation, and affecting, by their presence in the blood, the different grades of this property, their influence being exerted in this way, either upon the organic and cerebro-spinal nervous systems, and through them upon the irritable structures, or upon these structures directly, or even upon these systems and structures conjointly and coetaneously. The changes also which take place in the blood, in the course of diseases, particularly contaminating maladies and fevers, owing either to the absorption of morbid matters into the circulation, or to interrupted elimination of effœte and injurious materials from it, affect the several forms of irritability, and even the vital cohesion of the tissues, in the manner now explained; the absorption or accumulation, however, of these excrementitious matters, generally having a similar effect to that produced on the frame by animal poisons. Contractility is affected by the various stimuli or irritants, which may act either directly on irritable or contractile parts, or on nerves supplying them, or on the central nervous organs; but remarks on this part of the subject, as well as on the varying susceptibility of irritation, in different persons and diseases, will find a more appropriate place in the article Irritation.

Bibliog. and Refer. — *Glisson*, De Ventriculo et Intestinis. 1678. p. 239. — *Baglivi*, De Fibra Motrice, &c. Opera, an. 1703. p. 261. — *De Gorter*, Medicinæ Compendium, 1731. — *Winter*, De Certitudine in Med. Pract. 1746. — *Haller*, Deux Mémoires sur les Parties Sensibles et Irritables. Lausanne, 1756; et Elementa Physiol. l. iv. et l. xi. — *Zimmerman*, De Irritabilitate, &c. 1751. — *Bordeu*, Recherches Anat. sur les Glandes, &c. Paris, 1751. — *Senac*, De la Structure de Cœur, &c. Paris, 1749. — *Whytt*, Physiol. Essays. Edin., 1755. Works, &c., p. 274. — *De Haen*, De Sensibilit. et Irritabil. Hum. Corp. 8vo. 1761. — *Battie*, De Princip. Anim. Exercit. London, 4to. 1757. — *Farr*, on Animal Motion, &c. Lond. 1771. — *Monro*, Structure and Functions of the Nerv. System. Fol. ed. 1833. — *J. Brown*, Elementa Medicinæ, cap. 11, 12. — *G. Blane*, On Muscular Motion. Philos. Trans., 1788. — *Cruickshank*, Philosoph. Trans., 1795. — *J. L. Gautier*, De Irritabilitatis Notione, Natura et Morbis, 8vo. Hall. 1793; et Physiologie und Pathologie der Reizbarkeit, 8vo. Leips. 1796. — *E. B. G. Hebenstreit*, Doct. Physiol. de Turgore vitale brevis Expositio, 4to. Lips. 1795. — *G. Prochaska*, De Carne Musculari, Opera minora Anat. Physiol. et Pathol. &c. vol. i. Vien. 1800; et Bemerk. ueber den Organismus d. m. Körpers. 8vo. Wien. 1810. — *G. R. Treviranus*, Ueber Lebensturgescenz, in Phys. Fragm. th. i. s. 57—102. — *J. Gregory*, Conspect. Med. Theoreticæ, &c. *passim.* — *Legallois*, Expériences sur le Principe de la Vie, p. xvi. — *Bichat*, Recherches sur la Vie et la Mort. Paris, 8vo. *passim;* et Anatomie Générale, 8vo. Paris, *passim.* — *J. Copland*, in Lond. Med. Repos. vol. xvi. p. 370. — *Richerand*, Elements of Physiology, &c. with Notes and Appendix, by *J. Copland*, 8vo. Lond. 1824, and edit. 1829. — *Fournier* et *Begin*, in Dict. des Scienc. Méd. t. xxvi. p. 94. — *Adelon*, Physiologie de l'Homme, 4 vols. 8vo. Paris, edit. 1829, *passim.* — *D. B. Mojon*, Laws of Physiology; trans. by *G. R. Skene*, 8vo. Lond. 1827. — *R. A. Rudolphi*, Elements of Physi-

---

[*] “ It appears, from the effects of agents upon voluntary or other muscular parts, when directly applied to the ganglial or vital nerves, — from the intimate organization of contractile parts, — from the distribution of these nerves to the vascular system, to the extreme capillaries, and to voluntary as well as to involuntary muscles, — that the ganglial or vital nervous system gives rise, in both these kinds of muscles, to the phenomenon called irritability; the different manifestations of this property, as it is displayed in voluntary and involuntary muscles, resulting from the accessary supply of the spinal nerves which the former muscles receive. (*Notes*, &c., 1824.)

ology, &c. trans. by *W. D. How*, 8vo. Lond. 1825, p. 207. — *M. Hall*, Phil. Trans. 1833. — *F. Tiedemann*, Systematic Treatise on Comparat. Physiol. &c. trans. by *J. M. Gully* and *J. H. Lane*, &c. 8vo. Lond. 1834, p. 289. — *J. Müller*, Elements of Physiology, trans. by *W. Baly*, 8vo. Lond. 1840, vol. i. *passim.*—(*A. Walker*), Documents and Dates of Modern Discoveries in the Nervous System, 8vo. Lond. 1839, p. 155.—(*See also the numerous recent works on Physiology.*)

IRRITATION, — Syn. Οργασμος, ερεθισμος, Gr. *Irritatio*, *Irritamentum*, Lat. *Reizung*, Germ. *Irritazione*, Ital.

Classif. — General Pathology — Special Pathology and Therapeutics.

1. Defin. *An exaltation of the vital actions of a particular tissue or system, relatively to the vital states of other parts.*

2. I. Preliminary Remarks. — Next to *Inflammation* the morbid condition to which the term *Irritation* has been applied, is the most important both to the pathologist and to the rational practitioner. Notwithstanding this, the term has been vaguely employed; and the existence of the morbid states, which it has been used to designate, has been as loosely inferred. This has arisen, in a great measure, from the neglect of these states, until a comparatively recent period, by most writers on general and special pathology; from the want of any precise ideas respecting the nature, extent, and relations of the morbid actions, to which the term irritation is applicable; and from the difficulty of determining the modes, grades, transitions, and consequences, which these actions experience. The varying characters, also, of irritation with the tissue or part primarily or chiefly affected, and with lesions of adjoining or of functionally associated parts, and the superinduction of other morbid changes, more particularly of increased exhalation, secretion, and inflammatory action, have given rise to much perplexity, in respect not only of the meaning attached to the word, but also of attempts of ascertaining its existence, seat, and extent. Hitherto irritation, as a primary morbid condition, has been inferred more frequently from the absence during disease of more manifest alterations, than from any positive proof of its presence; and to it have been referred by many, those disorders and maladies which could not be imputed to any more palpable lesion.

3. It has been shown, in the article Irritability: — 1st. That irritability is the chief manifestation or expression of life in the tissues and organs of a living body; — 2d. That it exists in various grades and modes according to the organization and connections of different textures and systems, the functions of organs being discharged in great measure by such agencies; — 3d. That the modes and grades of this property ascend from simple vital cohesion up to that form of muscular contractility which is determined and regulated by the will[*]; — 4th. That in this, its highest grade, it interests and is associated with conscious sensibility[†]; — 5th. That it is variously affected by the states and changes of the nervous system more particularly by the organic or vital nervous system, and by the conditions of the blood; — 6th. And that such affections constitute the principal alterations in numerous constitutional maladies.

4. To these fundamental principles of pathology, which were fully developed by me many years ago (*Lond. Med. Repository*, vol. xvii.), others may be added having a stricter reference to the subject now under consideration. The grades and modes of irritability thus vary not only in different organs or parts, but also in different epochs of life, in different temperaments and habits of body, and under the influence of numerous physical agents and various moral influences. Depending as it does upon the amount or condition of vitality, so it must necessarily vary with the states of this actuating and controlling principle. Where this principle is powerfully or largely imparted, irritability will also be energetically evinced, and long exerted; but where life is depressed, exhausted, or feeble from the earliest endowment of it in the structures, then irritability will be feebly expressed, readily excited in its highest grades, and speedily dissipated. With weakness or vital depression, irritability becomes more easily roused — the susceptibility increased — or, in other words, the disposition to contract upon the application of irritants is greater; but the contractions are weaker and the sooner cease altogether. Yet this increased susceptibility of parts thus weakly endowed is not general, and exists chiefly in parts which manifest the higher grades of irritability.

5. Another important circumstance which may be noticed is the increased disposition of local irritation to extend itself in proportion to the increase of susceptibility, or, in other words, to the diminution of vital power. This augmented disposition to the extension of irritation, and to the manifestation of several of its effects in different and remote parts, evidently depends upon the same primary condition, to which I have attributed increased susceptibility; namely, weakened organic nervous energy or vital power. Hence an increased disposition to be affected by irritants generally, is associated also with a disposition to extend their effects to distant parts. The extension of irritation, or rather of its effects, far beyond its primary seat evidently depends upon, or rather takes place through the medium of the organic or vital and the cerebro-spinal nervous systems, the former especially: but this topic will be more fully considered hereafter.

6. Illustrations of the foregoing pathological facts are daily presented in practice. We continually observe in persons originally and organically feeble, in those who have become feeble from the exhaustion consequent upon excessive or repeated excitement, and in those depressed by disease, all contractile parts, more particularly muscular structures, to be readily acted on by irritants, especially by such as are novel; but the excited action is weak, or is soon exhausted, and rapidly sinks the principle upon which the contractility depends. In connection also with this local susceptibility, an increased disposition to experience the effects of the local and primary irritation in distant parts, is also developed; and these distant parts often manifest the prin-

---

[*] "The lower grades of contractility depend entirely upon the organic or ganglial nervous system and influence; the highest form only upon the super-addition of the nervous system of voluntary motion and sensation." (*Author's Physiol.*, *Notes on.*)

[†] "Conscious *Sensibility* is confined chiefly to certain parts and textures of the body, and is dependent upon the part of the nervous system of which the encephalon is the centre. *Contractility* exists throughout the whole animal structures, although in different grades, and is, with the exception of its highest grade or species, entirely independent of sensibility and volition: — contractility is a general expression of life, sensibility of the higher functions only of this principle." (*Notes*, &c.)

cipal amount of disorder, evincing both its nature and primary seat. In these cases, irritable parts become more susceptible of irritation, or *morbidly irritable*, not only locally, but generally also as respects the nervous systems, especially the organic nervous system, upon which the several grades of irritability have been shown to depend. And here, it should be recollected that the term *irritable* admits of two meanings, which should not be confounded with each other: some parts are *naturally and healthily irritable;* and these as well as some other parts become *morbidly irritable*, owing to numerous causes — to excess or deficiency of stimuli, to the operation of noxious agents, or of most of the causes of disease. A morbid state of irritability may be either more or less local or limited, or extended and constitutional; but in either case, the susceptibility of contraction is increased, whilst the power and duration of it are the sooner exhausted. Mr. Hunter defined morbid irritability to be "an increased disposition to act without the power to act with," with much truth, although with insufficient precision; but it will generally be found, as I have just stated, that the amount and duration of "*power*," will be deficient in proportion to the "increased disposition." In all cases of *morbid irritability*, whether local or constitutional, the intrinsic and extrinsic causes and circumstances connected with it should be considered; and this state, moreover, ought to be carefully distinguished from *irritation;* for the former may exist without the latter, owing to vital depression merely, or to this state associated with others; and the latter may be induced and continued by local agents, where the former can hardly be said to be present, more particularly with reference to the constitution generally. Physically as well as morally, irritation may be caused, and yet morbid irritability may not be present, although the one will favour and aggravate the other mutually. Both states are frequently associated, but they are not necessarily connected.

7. II. Of the Pathological Relations of Irritation. — If an irritant or stimulus act upon a living tissue or organ, certain changes, having reference to the nature of the functions discharged by the tissue or organ which is acted upon, and to the properties of the agent employed, are thereby produced. If the digestive canal be acted upon by one particular irritant, certain of its actions are augmented or modified; if a different irritant is employed, others of these actions are increased; and if the irritant be more powerful or in excess, the effects are locally heightened and extended to remote parts. If the external structures and organs be irritated, sensibility is excited, and all the functions of the part more or less increased or otherwise affected. Whatever may be the function of a part, such function will be exalted by a moderate irritant; but it will be disordered or even overturned altogether by an excessive one, owing to the effects thereby produced in the circulation and organization of the part upon which the irritant has acted. Seeing that the operation of irritants is thus different as respects their actions individually, and as regards the tissues chiefly affected by them, and consequently that *irritation* is various in its characters, extent, relations, and consequences, according to its cause and seat, it becomes requisite to the due investigation of this important department of pathology to analyse it more fully.

8. i. Relations of Irritation to the Nervous Systems. — *A. To the Organic or Vital Nervous System.* — The vital actions of a part, and contractility in particular, have been shown, both here, and in the places already referred to, to depend upon this system. When a tissue is irritated these actions are affected, and it may, therefore, be reasonably inferred, that the cause of irritation acts chiefly upon the system by means of which these actions are produced, and that, in consequence of changes in the parts of this system distributed to the tissue or structure which is irritated, the effects of irritation are developed. If a portion of the intestinal canal be irritated either by mechanical or chemical stimuli, its contractility is first augmented. If the irritating cause, or the irritation however excited, continue for a time, the secreting functions and the circulation are affected: and if it be energetic or excessive, these are still more increased, and sensibility so obscurely bestowed on this part is acutely roused. In addition also to these changes, the irritation, which was limited, whilst it was slight, to the parts more immediately subjected to its causes, now extends itself, influencing different systems and parts: and, owing to the connections of the organic nervous system with the cerebro-spinal, not only is sensation acutely affected, but also the contractions of voluntary muscles are violently excited, without either the influence or the control of the will.

9. Irritation thus originating in parts endowed chiefly by the organic or vital nervous influence, will either continue more or less *limited in its sphere*, or *extend itself* to various parts according to the general susceptibility of this system, to the predisposition or susceptibility of particular organs, and to various concurring or determining causes. — *a.* Where the irritation is slight relatively to the amount of organic nervous power, or where the susceptibility is not increased, the *limitation* of it to its original seat may be long continued; but where it is more considerable, organic nervous power being low, and the susceptibility either general or local consequently high, it will *extend itself*, or manifest its effects, more or less prominently, in remote situations. The *limitation* of irritation may be so complete that one function only of one organ is affected; but this seldom is of long duration without other functions and organs experiencing disorder. Thus, owing to mental emotion acting as an excitement to the cardiac nerves, palpitation or excessive action of the heart is produced; and in consequence of the irruption of bile into the intestines, increased action of their coats is occasioned; but this discharge seldom is great or continued, without producing augmented secretion from the intestinal mucous surfaces generally, and increased determination of blood and other changes of the vascular system, consecutively, as will be hereafter shown.

10. *b.* The *extension of irritation*, particularly when seated in an internal or vital part or viscus, takes place either *directly*, by means of the communicating ramifications of the organic or ganglial nervous system, or *indirectly*, and by a *reflex* operation of the ganglial nerves, conveying the morbid impression or action to the roots of the spinal nerves, or to the spinal chord and brain, and

thereby exciting the sensations or actions of parts supplied with nerves by the cerebro-spinal system, or in both these modes, either consecutively or contemporaneously. These two distinct ways by which irritations or impressions are transmitted to parts remote from the seat of impression, were pointed out by me, many years ago, and described by the terms *direct* and *reflex sympathy*. (See *Physiological Notes*, &c., 1824.)

11. *a.* The *direct transmission* of irritation may take place either along parts or tissues similarly constituted, as mucous or serous tissues, or from one organ to another, by means of the organic nerves with which they are supplied. In this manner, irritation of one part of the intestinal mucous surface often proceeds along it; or irritation of one part of the muscular coats of the bowels frequently extends along the tube, or affects it to a greater or less extent, as in colic and hysteria. The morbid impression also, made upon the organic or vital nerves of one tissue or viscus, is often transmitted thence to an adjoining, but differently constituted, organ through the medium of these nerves, which are supplied to both. Thus, the irritants which affect the nerves of the duodenum or of the stomach primarily, extend their operation in many cases also to the liver and pancreas; and stimuli which excite the stomach raise the action of the heart and vascular system. Irritants of the kidneys frequently render the urinary bladder more irritable, or excite this latter viscus; and those of the rectum often extend their influence to both the urinary and genital organs. In cases of this description, it may be asked whether irritants or stimuli applied to an involuntary part excite the contractions and vital actions of such part by producing an impression on the organic nerves which is conveyed to their corresponding ganglia, and reflected thence by these nerves upon the muscular fibres which they actuate; or whether they act directly and without the intervention of the ganglia, independently of any reflex operation, and simply by affecting the state of the nerves themselves — by affecting the organic corpuscles and fibriles entering into the organization of the part. I would incline to this latter alternative; although I admit that the ganglia may generate an additional vital influence, reinforcing that with which the tissues and organs are endowed. The truth of this inference is confirmed by the fact, often observed by me and others, that involuntary contractile parts, as the heart and portions of the intestinal canal, may be excited to contraction even when removed from their connections with the ganglia.

12. *β.* As I have shown, when treating of various diseases originating in the nervous system, irritations commencing in the organic nervous system are often propagated to the cerebro-spinal system and thence *reflected* upon external and distant parts, either affecting the nerves of sensation, morbid sensation or pain being felt in parts to which such nerves are distributed, or exciting those of voluntary motion, so as to remove them out of the due control of the will. In this manner I explained, in the early parts of the work (published in 1832 and 1833), the origin of several spasmodic and convulsive diseases; and insisted, that the irritation thus conveyed to the roots of the spinal nerves, by means of the communicating ramifications of the grey or ganglial nerves, either might reach the spinal chord and brain, thereby exciting involuntary or automatic motions of involuntary parts and conscious sensation, or might affect the nerves of motion and sensation, and the parts supplied by them; the cerebro-spinal axis being only contingently implicated.*

13. *B. Relations of Irritation to the Cerebro-spinal Nervous System.* — That irritation of a part, as of an extremity, will excite contractions of the muscles of the same or of an adjoining part, independently of sensation or of the intervention of the brain, has been illustrated by Dr. M. HALL; but instead of attributing this to a "*reflex function*," as he has done, it may be explained, as I have many years ago attempted in a work already referred to, by means of a "*reflex sympathy*." Dr. HALL and Mr. GRAINGER, in endeavouring to establish the existence of this as a distinct function, have attempted to connect it with a particular organization of the spinal chord; and to show that there are not only nerves of sensation and voluntary motion, which have an intimate connection with the brain, and are actuated by it, but also a distinct class of nerves, which are independent of this organ, and arise from the spinal chord. This class he has denominated the "excito-motory," and "reflecto-motory" nerves. Dr. HALL limits the phenomena of reflex action to this class of nerves, and denies the cerebral nerves of special sense the power of producing them. He supposes the reflex motor actions to be in no case excited by sensation, nor even by means of the sensitive nervous fibres. He maintains the existence of spinal nerves, endowed with the "excito-motory" function; and the reflex action he supposes to be conveyed, not by the nerves of spontaneous motion, but by special fibres, which he calls "reflecto-motory." This theory of excited and reflex movements being produced by nervous fibres which are distinct from those which reach the centres of sensibility and volition in the brain, has been supported by Mr. GRAINGER and Dr. CARPENTER. The former believes, that the fibres of the roots of the spinal nerves, which pass into the chord, and are lost in the grey matter, as demonstrated by WEBER, BELLINGERI, and himself, are the true excito-motory and reflecto-motory fibres. Such may or may not be the case; or the nerves which thus originate in the grey matter of the chord may be destined to transmit to the ganglial system the influence generated by this part of the chord, thereby reinforcing, and, in certain places or ganglia, modifying the influence proceeding from the organic nervous system itself. Thus, the ganglia supplying the heart, the genital organs, and the outlets of mucous canals, are reinforced by nerves from the spinal chord; and it seems much more probable that the grey matter of the chord gives origin to them, and generates an influence necessary to the due performance of the functions of these parts, than that it gives origin to a class of nerves, the existence of which, as well as of their imputed functions, is altogether hypothetical.

14. The chief phenomena adduced in favour of an "excito-reflecto-motory" function, of its inde-

---

* The reader is referred to the articles CHOLERA, § 23., CHOREA, § 16., and CONVULSIONS, §§ 42—46., the last especially, for remarks upon *reflected irritation*, which were written in 1830 and 1831, and published in 1832, long before the appearance of Dr. M. HALL's views on the subject, and explained by him by means of a "*reflex function*."

pendence of sensation, and of the grey matter of the chord giving origin to nerves destined to perform this function are — 1st. That reptiles and various others of the lower animals, when decapitated, may still evince motion of a part when its surface is irritated: — 2d. That an apoplectic or paralysed person may retract or move the paralysed limb when it is pinched; and 3d. That infants, when asleep, may clench their hands when the palms are irritated. The same explanation applies to these several phenomena. But as long as they admit of explanation without calling into our aid the existence of a new and special apparatus for this purpose, the material presence of which is not demonstrated or even rendered probable, we are bound to refer them to the organization which is generally admitted, as parts of the offices discharged by it. In reptiles, and even in higher orders of animals, it has not been ascertained how far sensation is extended throughout the nervous system, or how closely it is confined to the brain, or the ganglia serving the offices of the brain. The distinctions, moreover, existing between conscious and inconscious sensations have never been attempted to be drawn; unless, indeed, in the brief manner I have attempted, many years ago, in my physiological notes. That the brain is the seat of conscious sensation, in the higher animals especially, will not be denied; but that a species of sensation — a susceptibility of motion and action, particularly of such motions and actions as have become habitual, is retained and exerted under the influence of certain stimuli or irritants, when the brain is no longer conscious, or even after its removal in young or in the lower animals, cannot be doubted. The mere turning in bed, whilst a person is soundly asleep, is a proof of this; and the motions of a limb, upon irritation of it, in apoplexy or in paralysis, is of a similar description. In these cases, the brain is not in a condition to manifest consciousness; but, with the rest of the nervous system, it may still be so impressed by an obscure feeling of uneasiness as to give rise to motion or change of position. The explanation given of these phenomena by Dr. M. HALL would have been more convincing, if a different one, equally, if not more conclusive, could not have been offered. For, if the facts and arguments adduced in the article IRRITABILITY, and elsewhere, be received, it will necessarily follow, that the irritation of parts acted on by volition will give rise to contractions of them, as in involuntary parts; seeing that the nerves of volition are merely superadded, in the former, to the organic or ganglial nerves, which supply them in common with all other contractile parts; and that contractions will thus take place in them independently of the transmission of the irritation by means of excitory fibres to the chord, in order to be reflected back again by means of other fibres. Even granting that the irritation is conveyed by nerves of sensation, it does not follow that it shall reach the chord itself, for it may only proceed as far as the ganglia on the roots of the nerves, and there partially affect the motory fibres corresponding with the sensitive fibres, without giving rise to conscious sensation.

15. Moreover, as the nerves of general and special sensation may be viewed *as originating in the tissues and organs they actuate, and the parts they endow*, as shown to be the case in respect of the organic or vital nerves, and as converging to the spino-cerebral axis,— being in fact centripetal nerves,— it may reasonably be expected, that irritation of a part will often give rise to motions of corresponding or associated parts, without the brain, or even the spinal chord, under certain circumstances, co-operating in the act, or taking cognizance of it. These nerves are thus expanded in the tissues and organs, so that an impression or irritation in any one point, however minute, is transmitted from them to the central organs of perception and volition, where it gives rise to conscious sensation, if it be sufficiently strong, and if these organs be in a state capable of discharging these functions; but when they are incapable of consciousness, as in sleep, apoplexy, &c., or when the impression is so weak as not to excite this function, still motions of voluntary muscles may follow, owing to "*reflex sympathy*," as explained in my *Physiological Notes*, already referred to. When the bronchial secretion rises to the larynx, it there irritates the nerves of sensation supplying this part; and the irritation, if the patient be awake, generally becomes an object of consciousness, giving rise at the same time, and by a reflex sympathy, to increased, or spasmodic action of the muscles of respiration: in such cases, as I have pointed out in my "*Notes*," the irritation is conveyed by the nerves of sensation to the cerebro-spinal axis, and thence reflected by the associated nerves of motion upon the muscular apparatus which the latter nerves supply. In many of these instances, the reflected motions, consequent upon the irritation, take place, although in a much less degree, when the brain is incapable, as in sleep, of taking due cognizance of the primary irritation; yet this is no sufficient proof, either that the brain is unnecessary to their production, or that the spinal chord alone performs them, or that a particular organization of both the chord and nervous system is destined for their performance. In the particular illustration now adduced, it is just as probable that the irritation excites the nerves of motion, independently of both brain and spinal chord, as that it acts through the intervention of one or both of them. To infer, then, that the chord contains, or is the centre of an apparatus destined to discharge certain offices, which offices may be readily performed by the agencies, and in the modes, previously conceived, and which consist merely of the reception and transmission of irritation or excitement, by sensitive and organic nerves, and reflecting such irritation by means of motory nerves upon voluntary muscles,— the grey matter of the chord receiving the fibres supposed to convey the irritation, and originating those transmitting or reflecting it upon the muscles, — is to suppose the existance of an organization too important for the amount of function to be performed,— is to assign a means of much too wide and great extent, for a contingent or an occasional office; and one, moreover, of the existence of which there is no visible, or palpable, or demonstrative proof.

16. If the apparatus argued for by Dr. M. HALL and Mr. GRAINGER really did exist, no reflex action could possibly occur when the spinal chord is destroyed; yet, nevertheless, the destruction of the chord could not be a satisfactory proof that reflex actions depend solely on it, seeing

that the vitality of the animal receives such a shock from an injury so very extensive as this, as would prevent these actions from being manifested. Indeed, some experiments which I have made induce me to infer, that reflex motion may take place independently of the spinal chord itself, and by means of the connections subsisting between sensitive and motive nervous fibres, in the various ganglia and plexuses, and that the isolation of those and all other sympathetic actions in a single part contended for by these writers is not consistent with the connected and reciprocative functions of the different parts of the nervous system. Moreover, it should be recollected that it is not motion alone that is thus reflected from the seats of irritation. In some cases, more especially when the irritating cause affects the organic nerves, or when parts chiefly supplied with them are affected, pain or morbid sensibility either alone, or in connection with disordered muscular action, is manifested in remote or corresponding parts. Hysteria and various spasmodic affections furnish sufficient illustrations of this.

17. In convulsive and spasmodic diseases, which have received specific but conventional appellations according to the forms they assume, we observe that irritation of sensitive and ganglial nerves gives rise to abnormal actions of the muscles, without any sufficient proof being furnished of the spinal chord being actively engaged in the circle of morbid action; and when the spinal chord or its membranes have presented any lesion after death from these diseases, there is every reason to infer that such lesion was merely an occasional contingency, the irritation being conveyed by these nerves to the plexuses and roots of the motory nerves, and reflected thence by the latter nerves upon the muscles, without the spinal chord being necessarily brought within the sphere of morbid action.

18. Irritation, therefore, whether of sensitive or of organic nerves, gives rise, in the cerebro-spinal nervous system, owing either to the propagation of the morbid impression in a direct manner, or to the transmission of it in the first instance to the roots of the spinal nerves, or to the spinal chord itself, and the reflection of it thence — 1st, to *spasmodic* or *convulsive actions* of voluntary muscles, as shown in the articles CHOREA, CHOLERA, CONVULSIONS, DISEASE, &c. — 2d, to *pain* or *altered sensibility* of some part of the surface of the body, or of particular nerves, or of a limb. — Irritation, also, of one portion of the cerebro-spinal nervous system may *directly* affect distant parts, or *indirectly* or mediately and by a *reflexed sympathy*, as already mentioned. When the irritating cause is in the brain or medulla oblongata, the functions of sensation and perception may be deranged, either solely, or in connection with morbid volition and muscular action or motion. In such cases, the irritation is *central*, its effect *direct* and immediate, and manifested chiefly in the functions performed by, or intimately connected with, the tissue most seriously affected. When the irritation is seated in the spinal chord, and is unattended by effusion or other cause of pressure on the chord, muscular action only may be excited, but generally excited in such a manner, or to such an extent, as to be no longer amenable, or to be imperfectly amenable, to the control of the will; or sensation only may be affected in various grades, the spinal irritation manifesting itself in the ramifications of sensitive nerves, and the morbid sensation becoming an object of consciousness through the instrumentality of the medulla oblongata and brain; or both muscular action and sensibility may be conjointly disordered. Illustrations of irritation of the central parts of the nervous system are constantly appearing in practice. When irritation is seated in portions of the grey or effective portions of the brain, the states of the mind, the sensations, and special functions of sense are chiefly disordered. When it extends to or affects the fibrous structure, muscular actions are deranged. When it commences in the medulla oblongata, general sensibility, the respiratory functions, and voluntary motion are disordered, according to the extent and grade of the primary morbid condition. When it implicates the spinal chord, the consequences vary with its seat, or as the grey or fibrous structure, or the anterior or posterior columns are solely or chiefly affected by it.

19. It has lately been supposed, as above stated, that the sympathies which I have called reflex, and those irritations which are propagated to the spinal chord, and reflected thence to remote parts of the external surface or to the extremities, with the tonic contractions of the sphincters, are essentially dependent upon the grey substance of the chord; but there is much more reason to believe that this substance is chiefly concerned in generating an influence necessary to reinforce and increase that produced by the ganglial nervous system; and that this influence is conveyed by nervous fibres to the plexuses and ganglia of this system, and to the muscles of voluntary motion. Irritation, therefore, of the grey tissue of the spinal chord will thus affect the thoracic and abdominal viscera obscurely, indirectly, and through the medium of the ganglial system; but more directly and obviously the muscles of voluntary motion, the actions of which will be thereby removed more or less from under the control of the will, and thus become involuntary or automatic. It is very probable that the continued action of the sphincters very much depends upon this part of the chord; but in this case the action is *direct* — is immediately dependent upon this organization, and not merely reflex; but it may be allowed, that, in common with all other muscular actions admitting of being influenced by volition, irritation in the vicinity of sphincters will induce, both directly and indirectly, as above explained, increased contraction of the sphincters.

20. It has likewise been supposed that the spinal chord, and more especially the grey substance of it, is the source of irritability. I have already ascribed this very important, and indeed chief manifestation of life, to the organic or ganglial nervous system, whether as manifested in the voluntary or in the involuntary muscles, — in hollow muscles or in sphincters; the fibres proceeding from the spinal chord conveying the influence generated in this quarter to these parts, and reinforcing, increasing, or otherwise influencing, that which is produced by the ganglial system; this latter system being, however, the chief source of the tone and irritability of these several orders of muscles. It is, moreover, very probable, although the fact cannot be satisfactorily demonstrated by experiment, that the grey matter

of the chord is that part only which generates the power thus destined to reinforce and increase the power conferred by the organic or ganglial system, and especially to augment the energy which the ganglial system confers upon the generative organs. Thus, whilst these organs have large ganglia and plexuses of organic or vital nerves — (of grey and non-tubular fibres) — with large communicating branches running between them and the other ganglia, very considerable branches of nerves — (of white tubular nerves) — are also sent from the sacral spinal nerves; but, instead of ramifying directly in these organs, they always proceed by the most immediate or direct routes to the ganglia which supply these organs. The sphincters, also, are supplied with organic or ganglial nerves and with spinal nerves; the latter, however, particularly as respects the sphincter ani, &c., proceeding directly to this muscle; so that, although the tonic contractions of the sphincters depend upon the organic nerves, these contractions may be exalted by volition, through the instrumentality of the spinal nerves.

21. Whatever energy may thus be supplied by the spinal chord to the genital organs and sphincters is most probably generated by the grey substance of the chord, whilst the will merely stimulates this energy, and develops it in a more or less active and sensible manner. If we analyze the phenomena manifested by the generative organs, we shall find that the essentially vital and insensible changes and functions of these organs are dependent upon the organic nerves with which they are so abundantly supplied, and upon the connection of these with the rest of this system; whilst the excitation of these functions, and the sensible changes attending such excitation, take place through the medium of the organization of the spinal chord and of the nerves proceeding from it. The former of these classes of phenomena require little remark, further than that they are performed with a degree of perfection proportionate to the strength and constitution of the individual. The latter phenomena are produced in one or other of two modes — either by the influence of the mind upon the nerves of these organs, through the medium of the chord, or by the local irritation of these nerves; the influence of such irritation extending not only to all these organs, but also to the spinal chord, and to the brain, whence it may be again reflected back upon them, and upon other parts.

22. While thus the tone, irritability, and strength of contractile and sensitive parts are furnished by the organic nervous system, and augmented by the influence generated by the grey substance of the chord, irritation, implicating either of these parts of the nervous organization, excites and removes from under the control of the will the functions of the parts which receive nerves from the part irritated; and while irritation of the parts giving origin to nerves necessarily exalts the functions performed by these nerves, whether these be sensitive or motory, yet, if it be either carried to too high a grade, or continued too long, vital exhaustion will succeed. The vital tone and irritability of contractile parts will also be exhausted by the excitement caused by volition, when either energetic or prolonged beyond what is necessary to the healthy developement of these functions.

23. ii. RELATIONS OF IRRITATION TO, AND INFLUENCE ON, THE VASCULAR SYSTEM AND BLOOD. — There can be no doubt of the commencement of many of the diseases, both local and constitutional, of which the vascular system is the seat, in the nerves, more especially in the ganglial or vital nerves supplying this system, and the several tissues and secreting structures. I have attempted to show that this must necessarily be the case in respect of many maladies, both in the article on DISEASE generally, and in those on specific affections. At the same time, I have not only admitted, but even demonstrated, that the blood may be either primarily or consecutively altered from its healthy constitution; and that it may, moreover, present such states as, although they may not amount to actual disease, may strongly predispose to it, and contribute much to the development of it, as soon as the nervous system is subjected to any shock, irritation, or morbid impression; or as soon as some vital, or secreting, or excreting viscus experiences any interruption of its functions; the morbid condition of the blood, in its turn, affecting the nervous systems of organic and animal life, and exasperating or perpetuating disorders primarily seated in these systems.

24. The influence of irritation on the vascular system is well demonstrated by the changes consequent upon irritating the nerves of erectile, glandular, and mucous tissues. We observe excitement of the nerves of these parts produce expansion of the capillaries, increased action of the arteries, and turgidity of the veins. The irritation is thus generally followed by what has been variously denominated *turgor vitalis, vascular turgescence, vital turgescence*, &c.; and this condition, especially when favoured by the tissue, as in irritation of mucous surfaces, or by the temperament, constitution, or diathesis, or by states of the blood, may readily pass into active congestion or determination of blood — its common consequence; or into inflammation, or sub-inflammation; or it may give rise to hæmorrhage. As respects mucous surfaces, cellular tissues, and glandular structures, the usual consequences of irritation are increased exhalation, secretion, and vascular determination or flux; which, if allowed to proceed, or if the irritating cause act violently, is followed by some state or other of inflammatory action and its various consequences.

25. *A. The Relations of Irritation to the several states of Inflammation* are more intimate than have been generally admitted by pathologists. Irritation seated in any tissue, or in a secreting surface or organ, can be viewed, at its commencement, only as connected with the nerves of the part; and in this stage, as well as in those which follow, it is attended by more or less of altered sensibility. In some structures, *morbid sensation* may be the chief disorder throughout its course; but in parts which perform a secreting function, or which are highly vascular, augmented and otherwise altered secretion, and increased vascular determination and action, very generally supervene. In secreting surfaces and glands, an augmented flow of their natural products usually follows the commencement of irritation; and, as the irritation proceeds, or, as it increases, these products generally become not only augmented in quantity, but also changed in quality; and the vascular determination also is increased, or it

assumes an inflammatory form, or one very closely allied to the more chronic or sub-acute forms of inflammation, several of the changes usually consequent upon inflammation also appearing in the advanced progress of the disorder, thus originating in, and chiefly consisting of, irritation in its earlier stages. Diarrhœa, from irritating ingesta, or from cold, and simple catarrh, or catarrhal bronchitis, often furnish illustrations of this course of morbid action; and the more simple, as well as the more complex of the glandular structures, are liable to similar changes. A disorder of function, consisting of irritation or exaltation of the organic nervous endowment of the part, is gradually converted into structural disease, owing to this disorder having affected the secreting, and consecutively the circulating functions, morbid capillary and arterial action ultimately passing into organic change. Many of the forms of inflammation, particularly those which are chronic and sub-acute, originate in irritation, or in a change in the state of the organic nervous influence of the part, the liability to the vascular disease, as well as the grade of action, depending upon the susceptibility of the system in connection with the state of the blood, and with the nature of the tissue or structure in which the irritation is seated.

26. *B. The Relations of Irritation to Hæmorrhages and Serous Effusions* are very similar to those just instanced in respect of inflammations. The irritation which in one constitution would produce some form of the latter, will produce in others some one of the former; the particular effect being, in a great degree, influenced by the states of organic, nervous, or vital power, of the irritability of capillary tone, and of the blood; these states themselves being, in some measure, dependent upon those viscera chiefly engaged in the functions of assimilation and excretion; or, in other words, these several morbid conditions often acknowledging one source, namely, the state of the vital nervous influence. *Hæmorrhages*, particularly those taking place from mucous surfaces, are often traceable to local irritation, in connection with impaired tone of the extreme capillaries, and often with vascular plethora; but something is also to be imputed to the constitution, or individual conformation, as shown by the distinctive characters by which it is marked, and by its hereditary disposition. Many of the phenomena, also, preceding hæmorrhage, as well as some of those attending it, are referrible to irritation; this primary morbid condition of the organic nerves of the part influencing the states of vascular determination and action in the same manner as the irritation or excitement of the sensitive nerves of the sexual organs and of erectile tissues affects the blood-vessels of these parts. — *Serous effusion*, although occasionally a consequence of irritation, is much less frequently so than either inflammation or hæmorrhage; and is met with, as a result of this state, chiefly in leucophlegmatic or lymphatic temperaments, or in persons whose assimilating and excreting functions are impaired or interrupted.

27. *C. The Relations of Irritation to the Production of morbid Nutrition and Secretion*, although contended for by BROUSSAIS, and most of the pathologists of his school, are not so manifest nor so uniform, or even general, as they contend. Viewing irritation as simple exaltation of the organic nervous influence of the affected tissue, increased nutrition and secretion might be supposed to be legitimate consequences of it; and as irritation is not merely a simple, but also a morbid, exaltation of this influence, so these consequences might be also inferred to be morbid. These inferences are doubtless correct as regards many cases of morbidly increased nutrition and secretion, especially when the irritation is exerted chiefly upon muscular or contractile parts, and on secreting organs and surfaces. Irritation affecting the nerves of a hollow muscle will, if protracted, ultimately cause hypertrophy of this muscle; and a similar change in the state of the nerves of the liver, or of the digestive mucous surface, will both increase and otherwise change the secretions of these parts. Morbid nutrition and secretion, however, although very frequently proceeding from irritation, do not always thus arise; for either or both these more palpable changes cannot, in many instances, be traced to any obvious grade or form of irritation, so far as irritation can be viewed as *exaltation* of the organic nervous power; they must, therefore, be considered, as regards these instances especially, as consequences of a *perversion* of this power, as I have endeavoured to show in the article DISEASE. (See § 87. *et seq.*)

28. *D. That irritation should affect the state of the Blood*, particularly when prolonged or excessive in any important organ or tissue, may readily be admitted. The usual effects of irritation upon the vascular system, especially in producing a febrile state, and in thereby impeding the functions of digestion, assimilation, and excretion, must necessarily, more or less, change the blood from its healthy constitution. Even in cases where local irritation does not produce marked febrile excitement, or merely a remittent or intermittent form of it, the quantity, as well as the healthy condition of the blood, may be affected nevertheless. When irritation of a particular tissue or viscus takes place in plethoric persons, febrile excitement or reaction may be very fully manifested, and a consequent change in its constitution may take place with a rapidity co-ordinate with the grade of excitement; but, when the blood is deficient in quantity, or in the proportion of hæmatosine, the febrile excitement may be of either a low, remittent, or obscure form, or be identical with hectic, and the blood may experience still further changes in its quantity and constitution. But, in all cases, much of the effect produced by irritation on the blood will depend upon the temperament and circumstances of the individual, as will be shown hereafter.

29. Whilst, however, this condition thus affects the blood, the states of the blood, in their turn, exert an equally marked effect upon the local consequences or products of irritation; many of the products of morbid secretion and nutrition depending as much upon the conditions of this fluid as upon the irritation which, existing in a particular viscus, has determined these changes to take place in it. Indeed, the materials furnished by the blood often constitute and characterize these changes, the local irritation causing either a discharge of a portion of these materials in the secretions of the part, or their deposition in its structure, thereby giving rise to various organic lesions, more fully described in the article DIS-

ease (§ 93. *et seq.*), and in the various articles more particularly devoted to each of these lesions.

30. iv. Of the Propagation, Reflection, Reaction, and other Consecutive and Sympathetic Phenomena of Irritation.— Irritation may act in various modes, or may have its effects limited or extended, in various grades, in different persons, in diversified circumstances, and according to the kind, nature, or degree of the irritating cause. — It may thus be — 1st, Simple or direct, its effects being either local, extended, or propagated; — 2d, Reflected, or conveyed to some portion of the nervous centre or axis, and thence reflected upon distant parts; — and, 3d, Consecutive, sympathetic, or reactive, and constitutional. — As to each of these modes, it requires a more particular consideration.

31. *A. Simple and direct irritation* is, (*a*) at first, *local;* and, in this state, it may continue for some considerable time, or for a period so short as hardly to admit of appreciation; and (*b*) it may *extend* or propagate itself, or its effects, to more distant parts. The extension of the morbid action, condition, or impression, of which irritation consists, varies, — 1st, with the nature and intensity of the cause producing it; — 2d, with the state of organic nervous or vital power; — and, 3d, with the conditions of the blood and of the excreting or depurating functions. When the cause is intense in its operation, and at the same time contaminating, vitally depressing, or poisonous, relatively to the state of vital power or resistance, the irritation, or local effect, produced by such cause is rapidly extended, by means chiefly of the organic nervous and vascular systems, to adjoining parts, and even to the whole frame. On the other hand, when the cause is merely mechanical, or simply irritating, without being depressing or contaminating, the constitutional energies continuing unimpaired and the blood uncontaminated, the irritation may be long in producing more extended effects, or materially injuring the frame. It is chiefly when the organic nervous influence is weak, the secreting and excreting functions are already impaired, and the blood more or less morbid, that irritation is rapidly followed by severe local and constitutional disorder. When the blood is superabundant as to quantity, and especially as to the quantity of hæmatosine or fibrine and albumen, relatively to that of serum, — when the blood is thus rich and inflammatory, and the temperament and diathesis are sanguine and phlogistic, then the irritation, unless its cause be poisonous or contaminating as well as irritating, soon assumes an inflammatory character, and is quickly followed by all the local and constitutional effects of inflammation.

32. When the irritation is slight or moderate, the blood being neither superabundant nor rich, or even somewhat deficient or thin, and the temperament being phlegmatic or lymphatic, then it may not produce great change, either locally or constitutionally, until it has continued long, or affected the secretions of the part; but when these states of the vascular system are coexistent with the nervous or irritable temperament, the local, and especially the remote and constitutional, effects of irritation will be quickly and severely manifested, particularly on the nervous system, and on muscular or contractile parts. Illustrations of these facts occur frequently in practice, and are met with in many of the affections characterized by extreme pain and spasm. Irritation is influenced, as to grade and consequences, not only by the temperament, diathesis, and states of the blood and of the secretions, as just stated, but also by organic nervous power, and by whatever tends to depress or vitiate this power, or to contaminate the blood.

33. In depressed states of vital power, irritation more rapidly developes its effects, other circumstances being equal, than when this power is unimpaired; the resistance exerted by the constitution to the morbid impression or irritation being weaker, and consequently the less capable of overcoming this primary affection, which increases and extends itself with a rapidity co-ordinate with the vital or the organic nervous depression or exhaustion. Morbid conditions of the blood, arising from the passage of contaminating matters into it, or from the accumulation of effœte materials in it, owing to deficient or interrupted action of eliminating organs, exert an equal, if not a still more remarkable influence, in favouring and in accelerating the extension and consequences of local irritations. Punctures, external abrasions, local injuries, the acrid, contaminating, and animal poisons, and numerous other causes acting locally, or even on the minutest point of the organism, produce effects of the most severe and deleterious character in these circumstances of organic nervous power and of the circulating fluids; and, although these causes are often deleterious in the most healthy conditions of the frame, yet are they very much more so in the circumstances just now stated, occasioning the worst forms of erysipelas, diffusive inflammations of the integuments and subjacent cellular tissue, the most violent constitutional disturbance, contamination of the blood and soft solids of the body, with effusion into shut cavities and other lesions, and ultimately death.

34. *B. Reflected Irritation* may be of *three kinds;* namely, — (*a*) The irritation may occur in a surface or part of a viscus supplied either chiefly or solely with organic or ganglial nerves, and be transmitted to the ganglion by the nervous fibres first affected, and thence reflected upon these fibres themselves, or upon others supplying different structures, or communicating with other parts of this system, or with the cerebro-spinal axis. — (*b*) The irritation may commence as in the preceding variety, and extend to either the roots of the spinal nerves, or the chord itself, and thence be reflected, in the form of pain or spasm, to superficial parts, or to the extremities. — (*c*) The irritation may commence in, or affect, the nerves of sensation in these last situations, be transmitted to the spinal chord, or to the roots or ganglia of the spinal nerves, and be reflected thence by sensitive and motory nerves, occasioning altered sensation, morbid sensibility, or convulsive or irregular movements. These several modes of reflected irritation occur most frequently in nervous and irritable temperaments, and in persons neither plethoric nor robust.

35. *a. The first of these* often attends visceral disease, both functional and organic, hysteria, the several forms of colic, constipation, gastro-intestinal disorders, visceral neuralgia, or painful affections of the abdominal organs, and diseases of the

sexual and urinary organs, but generally in irregularly or imperfectly manifested states. Irritation of the nerves of the uterus or ovaria, or exaltation of their sensibility, may be extended to the ganglia, from which these nerves depart; and be reflected thence, not only upon these organs themselves, but also upon the intestinal canal, giving rise either to irregular movements of its muscular coats and to borborygmi, or to altered sensibility, or to abdominal pains, such as I have described in the article HYSTERIA, or to both spasm and pain, as in hysterical colic. The irritation of calculi in the pelvis of the kidney may be extended to the renal ganglion, and be thence reflected upon the digestive tube in the form either of colic, or of nausea or vomiting. The irritation of calculi in the bile-ducts may, in a similar manner, be reflected upon the duodenum, stomach, or other abdominal organs.

36. *b. The second variety* of reflected irritation, or that extending to the cerebro-spinal nerves, and from thence expressed upon superficial or distant parts, may exist either alone or in conjunction with the foregoing variety, as in the several forms of hysteria, especially the more irregular forms of it, in chorea, in verminous complaints, in symptomatic epilepsy, cholera, &c. In these affections, as shown in the articles devoted to them, irritation affects a certain portion of the organic nervous circle, and extends to corresponding ganglia, and is thence reflected upon the fibriles of grey nerves supplying other viscera, or upon those communicating with the roots of the cerebro-spinal nerves, occasioning either altered sensibility or extreme pain in the extremities of the nerves of sensation, or spasmodic or uncontrolled movements of the voluntary muscles, through the medium of the nerves of motion. The convulsive affections of infants and children are frequently thus produced, without any disease of the brain; although the circulation in this quarter generally is affected in the course of the convulsion, owing to the disorder of the respiratory processes attending it, and to the impeded passage of blood through the lungs and heart. The irritation of worms in the intestinal mucous surface gives rise not only to various painful and spasmodic states of the canal, and to palpitations of the heart or of the abdominal aorta, but also to convulsions and spasm of voluntary muscles in the manner just explained, and as I have stated in the article CHOREA (§§ 16, 17.). In 1820 I treated at a dispensary a case, characterized by constant clonic spasm or convulsive movements of the abdominal muscles. The cause was instantly recognised: spirits of turpentine were prescribed, and immense accumulations of fæcal matters and many hundreds of lumbrici were evacuated; and then the convulsions of the voluntary muscles ceased. This case was published (see *Lond. Med. Repos.* vol. xvii. p. 242.), soon after its occurrence, and was explained as above. Other illustrations of this form of reflected irritation might here be adduced, but they are unnecessary; others will be noticed hereafter.

37. *c. In the third variety*, or when the irritation implicates, or is seated in, the cerebro-spinal or sensitive nerves, and is transmitted either to the plexuses of nerves, or to their roots, or through these to the spinal chord, and even to the brain itself, and is reflected thence so as to manifest its effects in the form either of spasm or convulsion, or of pain or altered sensibility of some superficial or distant part or limb, then consciousness is frequently affected in some way or other in the course of the process; and, consequently, the functions of the brain are co-ordinately implicated. Still the brain may be no further affected than in being cognizant of either the primary affection, or of its sympathetic effects, or of both. In this case, only one of the functions of the brain is acted upon, and all the other functions are unimpaired and unaffected. But, in other instances, the irritation, owing either to its intensity and extension to the cerebro-spinal axis itself and more especially to the brain, or to the latter organ being implicated in the course which it takes in developing its effects, may so affect the brain as completely to overpower its functions; yet this result rarely takes place without being attended by convulsions.

38. On a careful examination of disorders characterized by convulsions, spasms, or irregular muscular actions, we shall find that they may be divided into — 1st, those which are attended by consciousness; — and, 2d, those in which consciousness is suspended. The one, however, may pass into the other, but in comparatively rare instances. In the former of these, the brain retains the power of sensation, and is not incapable of exerting its functions during the paroxysm; in the latter, conscious sensation is for a time altogether overwhelmed, and is restored more or less rapidly after the attack has ceased. It may reasonably be inferred that, in the one, the primary irritation is propagated to the roots of the spinal nerves only, or to the spinal chord, and reflected thence by the motor nerves upon the voluntary muscles, the brain being still capable of discharging all its functions, excepting that of controlling the muscular movements; in the other, the irritation extends to the brain, or affects it or its circulation, in such a manner as to suspend or to extinguish consciousness and all its modifications for a time. In many, if not all the latter class of cases, the medulla oblongata seems to be the part more immediately implicated: as soon as the affection extends to it, consciousness and the other subordinate manifestations of mind being suspended for a time. (See article CONVULSIONS, § 42. *et seq.*)

39. *b. Severe or neuralgic pains* are often caused by irritation, the source of which may be in the trunk of the nerve whose terminations are thus affected, or in the spinal chord, or in visceral or ganglial nerves passing to the roots of the spinal nerves, or to the spinal chord itself. In this latter case the primary irritation manifests its effects in distant parts by a *reflex sympathy*, as already described, and as long since insisted upon in the works already referred to. In all instances of pain from irritation, whether the irritating cause be seated in the nerve itself, or in the chord, or in other or distant nerves, the effect being reflected by means of either the chord or of ganglia, it is expressed chiefly in the ultimate ramifications or smaller branches of nerves. When the pain is seated in the trunk of a nerve, it will generally be found that the sheath or neurilema of such nerve is inflamed, either in the seat of pain or near it. In a case recorded by Dr. DENMARK, where extreme pain was felt in the points of the fingers and

thumb, the limb was amputated, and a small portion of a ball, which had been detached from it when it struck against the bone, was found imbedded in the fibres of the median nerve. In several cases which have occurred in my practice, as well in others recorded by authors, irritation and chronic inflammation of the spinal chord or of its membranes have been attended by pain in nerves, chiefly of their extremities, given off from the parts of the chord chiefly affected. Numerous illustrations of this are given in the article NEURALGIC AFFECTIONS. In nearly all cases where the pain is caused by irritation merely, it is intermittent or periodic, or returns only after distant intervals. But when it is produced by inflammation, or by irritation of an intense and permanent kind, it is either continued or remittent only. When it proceeds from the former cause, it is sudden in its accession, intense in grade, often brief in duration, and it generally ceases suddenly. When it arises from the latter cause, it is more gradual in its increase and subsidence, and more permanent than in other circumstances.

40. The cases of pain from irritation, expressed in distant parts by reflected sympathy, furnish some very singular phenomena, which fall more particularly under consideration in other articles. These are characterized chiefly by their seat, intermittency or remittency, and by the non-febrile and non-plethoric states of the vascular system, in the very great majority of instances. Thus, irritation of the stomach or bowels, by accumulated matters, or by acidity, or by flatulence, or by morbid secretions, often causes severe pain in distant and superficial parts, or even in less remote organs. A gentleman was seized suddenly with a violent pain in the heart. I was called to him, and whilst I wrote a prescription, I directed him to swallow two or three small pods of Cayenne pepper, which were at hand in a bottle of pickles. He instantly afterwards eructated much flatus, and the pain as instantly ceased. Pains of short duration, but of great severity, are often experienced during disorders of the digestive organs, in various parts of the body, far removed from the seat of irritation. Thus, pain at the vertex, or in the temple, or in a limb, or in other places, is sometimes felt; but it instantly ceases upon the escape of accumulated flatus, or upon the neutralization of acid in the prima via, or after the operation of an emetic or of a brisk cathartic. (See article NEURALGIC AFFECTIONS.)

41. C. *Reactive, Consecutive, and Sympathetic Irritation.*— In certain circumstances of the œconomy, especially those which will be noticed hereafter, irritation gives rise to general vascular reaction, or to various consecutive and sympathetic effects, having a more or less obvious relation to the state and grade of the primary affection. In most instances, the first effect of irritation is displayed in the vessels of the part, in one or other of the modes described above — in either inflammatory action or hæmorrhage; but in some cases, the irritating cause, owing to its nature, or to the part irritated, or to the constitution and diathesis of the individual, gives rise to very severe febrile commotion, or to various consecutive phenomena of either a painful, or a spasmodic or convulsive kind, without the local vascular disturbance being remarkable; and these effects may be general as respects the œconomy, or more or less limited in extent, or may change their seats and character. Chemical irritants, and various vegetable and animal poisons, produce these effects, which usually present a very marked speciality, their characters varying with the cause which produced them, and with the circumstances in which they are developed. Thus, the irritation of the digestive mucous surface, or of some part of it, by worms, by acidity, by flatulence, by noxious ingesta, or by accumulated sordes, frequently is followed by spasmodic movements of the voluntary muscles, by painful affections of the joints, by neuralgic or rheumatic pains, by gout, and by various visceral affections of a painful or of a functional kind.

42. The presence also of morbid elements in the blood, or the accumulation of those materials in it which require to be eliminated, will not only occasion irritation of some portion of the organic nervous system, but more especially of that portion which is supplied to or actuates the organs destined to the elimination of these materials, but will, at the same time, favour the rapid development of the reactive and sympathetic effects of the more local affection. Gout, erysipelas, and several other diseases, illustrate this principle; indeed, most of the disorders which are seated principally in the excreting organs furnish proofs of the truth of this view. From the foregoing it may be safely stated, that the sympathetic effects of local irritation are to be traced by means — 1st, of the nervous system of organic and animal life; — 2d, of the vascular system and blood; and, 3d, of the excreting viscera as influenced by the organic, nervous, and vascular systems. But the consideration of these, if further pushed, leads to the following part of the subject, which is very intimately connected with the foregoing general views.

43. v. CONSTITUTIONAL EFFECTS OF IRRITATION. — The principal and most serious effects of irritation are ascribable — 1st, to the nature of the irritating cause; — 2d, to the state of organic, nervous, or vital power, especially as manifested by the irritability of contractile parts; — 3d, to the state of the circulating fluids, particularly as respects the accumulation of excrementitial or noxious materials in the blood; — and, 4th, to the functions of eliminating and depurating organs. — *a.* Of the influence of the *causes* in determining the evolution as well as the kind of constitutional commotion produced by irritation, sufficient notice will be taken hereafter; and I have already shown (§ 31.) that the effects of irritation are, cæteris paribus, more extensively, more rapidly, and more severely propagated throughout the frame, the more the organic nervous or vital power is depressed at the time when the irritating cause is in operation.

44. *b.* When the circulating fluids are loaded with noxious elements or materials, in consequence either of interrupted excretion, or of the absorption of injurious matters, not only is the vascular system the more readily excited thereby to increased action, but the vital power is also greatly impaired at the same time; and hence, although vascular action is augmented, power is diminished, and the sooner altogether exhausted. The impeded or interrupted action of depurating or excreting organs, in first causing a morbid state of the blood, exerts, according to the extent of this primary effect, a similar influence, in developing, acce-

lerating, and aggravating the constitutional operation of local irritants; and hence the necessity of bringing our means of cure to act upon these organs in all cases of local as well as of constitutional irritation. The influence apparently arising, in connection with irritation, from a superabundance or deficiency of blood, and from a too rich or a too poor or watery state of this fluid, has been already noticed, particularly with reference to the supervention of inflammations, hæmorrhages, and various spasmodic and nervous affections; but these conditions of the vascular system seldom give rise to so rapidly developed, so severe, or so dangerous commotions of the whole œconomy, as when the blood is loaded with excrementitious materials, and when important emunctories are interrupted or impeded in their functions. It may be, therefore, inferred, as a pathological axiom, that, other circumstances being the same, the constitutional effects of local irritants, will vary with, and be proportionate to, especially in the rapidity of their development and in the severity and acuteness of their characters, the grades of vital power, and of vascular purity, and the states of the several emunctories. In proportion as power is reduced, and the blood is impure or changed from its healthy state, so the brain becomes oppressed, the soft solids contaminated, the vital cohesion of the tissues weakened, and the depurating organs impeded; effusions of serum, sero-sanguineous exudations, hæmorrhages, and various structural changes ultimately supervening, with more or less rapidity. Erysipelas, local irritants giving rise to diffusive inflammation of the cellular tissue, wounds or injuries, and punctures followed by severe disturbance, and many acute affections consequent upon irritating and morbid poisons, furnish sufficient illustration of these inferences.

45. vi. Of the Continuity, Periodicity, Duration, and Terminations, of the Effects of Irritation.—*A.* The effects of irritation are seldom *continued*, or of equal severity throughout, unless they be aggravated by morbid conditions of the blood, or by impeded action of the emunctories. In such cases they may be progressively acute or severe, until they terminate fatally, without any appreciable intermission or even remission. The blood may also be more or less contaminated, particularly by the absorption into it of morbid secretions, and yet the effects will still assume a periodic or remittent form, as in cases of hectic fever; but very generally the constitutional effects of irritation are continued when the blood is much contaminated either by absorbed matters or by uneliminated elements, as shown by most of the forms of erysipelas, by the consequences of punctured, poisoned, or contaminated wounds, and by numerous irritating causes acting locally in these states of the vascular system.

46. *B.* The effects of irritation, whether they be spasmodic, or neuralgic, or painful, or constitutional, are most commonly *periodic*, or recur after intervals, or become aggravated by paroxysms, if they do not cease altogether for a time. The recurrence or aggravation of these effects generally observes no regular periods, unless intermittent and remittent fevers be considered as constitutional manifestations of irritation of the organic or ganglial nervous system, in which point of view, indeed, I have chiefly contemplated them in their more simple states. As long as irritation extends no further than the nervous systems, and whilst the excreting organs and vascular system and blood are not greatly disturbed, it generally thus manifests itself more remarkably at one time than another. In many cases, the irritation seems to proceed or to exist in a latent form, or the irritating cause seems to have ceased to produce any results after its more immediate action, until some adventitious circumstance occurs, or some change takes place in the states of organic nervous or vital power, or of the excreting viscera, favourable to the development of its effects; and these effects may either increase progressively or recur more frequently, or they may soon cease altogether, owing either to exhaustion, or to the subsidence of the primary morbid condition.

47. In cases of neuralgic pains, the effects of irritation manifested in distant parts, as above shown, by either a *direct* or *reflex sympathy*, as well as in cases of spasmodic or convulsive movements similarly produced, we observe certain phenomena or circumstances of an important and practical kind; — 1st, That these attacks are immediate, severe, and continued in proportion to the intensity of the irritating cause relatively to the grade of constitutional or vital power; — 2d, That they are favoured and aggravated by whatever lowers the organic nervous energy and vital resistance, the intervals between them becoming shorter or less marked, and the seizures longer or more frequent, the more this power is reduced; — 3d, That these attacks are similarly affected by impaired excretion and evacuation, and by impure or morbid states of the blood; — and 4th, That they are influenced in the same way by mental depression, and by directing the mind either frequently or for a lengthened period to them.

48. *C.* As to the *cause* of the periodicity, or of the recurrence of the effects of irritation, no further or more satisfactory information can be given, than by assigning this character to a law of the animal œconomy which is observed as long as these effects do not extend much beyond the nervous systems, or implicate the more important emunctories and the blood and vascular system. If we attempt to proceed further in our research, we can infer only that all causes exciting or irritating the source of irritability and the sentient system produce their effects on sensibility and on muscular movements in a more or less remittent or paroxysmal manner, the intermissions being complete and prolonged in proportion to the slightness of the cause relatively to the susceptibility of the nervous system and state of vital power. Even the most violent of painful and spasmodic diseases, as neuralgia and tetanus, are characterized by exacerbations during the attack; and these exacerbations exhaust for a time the sensibility and irritability, which however are quickly restored under the influence of the causes which continue to excite them; or in other words, irritation being once excited in any part of the source of irritability or of the sentient system, explodes itself in fits or shocks on those parts most immediately connected anatomically and physiologically with these sources; and when the cause of irritation continues in action, or when the irritation is intense, although the cause which excited it may have been removed, the effects may continue until the vital energies are exhausted, or may even

increase with the vital exhaustion, until life is extinguished, unless some powerful agent be employed capable of fortifying the nervous power and vital resistance, and thereby enabling them to overcome the morbid impression which has been produced, or to resist the operation of the causes which are present, until the parts become accustomed to their influence.

49. *D.* The *duration* of irritation depends chiefly upon the same circumstances as have just been shown to influence the character or type of its effects (§ 45.): these circumstances, however, tend more especially to render the disease more acute, and of shorter duration, than it would otherwise prove. In general, irritation is prolonged in proportion to its slightness relatively to the degree of vital or constitutional power; and it may continue or recur for an indefinite period, as long as vascular action and the states of the blood, and of the emunctories, are not very materially affected by it. As these become deranged or remarkably diseased, so the duration of the resulting malady is equally short; and this is especially the case when muscular contractility is either inordinately excited, or very greatly impaired. Tetanus, rabies, poisoned wounds, &c., are illustrations of the short duration of the effects of irritation when its action is energetic, and when its consequences are extensive in respect of the nervous, vascular, and muscular systems.

50. *E.* The *terminations* of irritation have been partly noticed (§ 23.) when remarking the effects or consequences of it upon the vascular and muscular systems, and upon the secretions and nutrition. The effects of it on these parts of the œconomy are often intermediate between an advanced stage of its development and its termination; but still irritation may arise and subside, or *terminate in health*, without any of its more palpable consequences or strictly structural lesions having been produced; sensibility and contractility having been only temporarily disturbed. — It may *terminate in death* in a very short time, owing to the intensity of its action, or to its violence, as expressed chiefly on the sensibility, or on the muscular and vascular systems, and previously to any very marked effect upon the organization, although generally the secreting and excreting functions, and the changes in the blood requisite to the continuance of life, are either impaired or arrested before death is occasioned. — Irritation may also produce *various lesions*, already alluded to (§ 27—29.), these lesions either superseding, extinguishing, or merely masking the original mischief; or then greatly increasing both it and its effects. Most frequently when irritation terminates fatally, this result is owing more to the changes, often numerous and consecutive, produced by it, than to the violence of this state, as expressed merely on the sensibility and irritability of the frame; although the changes in these latter properties may either altogether, or only partly, produce this last result.

51. III. OF THE INFLUENCE OF THE AGENTS OR CAUSES ON THE STATES AND CHARACTERS OF IRRITATION. — i. *Of predisposition to irritation.* — An increased susceptibility of irritation may arise from a great variety of circumstances. The influence, however, of several of these is not satisfactorily established, or rather hardly admits of proof. It appears very probable that the usual causes of irritation act more readily, and with greater intensity; — (*a*) On the irritable, nervous, and sanguineous, than on the phlegmatic, bilious, melancholic, and lymphatic *temperaments*; — (*b*) On the scrofulous and gouty *diathesis*, and the delicate and enfeebled *constitution*, than on the sound and robust; — (*c*) On the *young* than on the old, and more particularly on infants and children; — (*d*) On the *female* than on the male sex. Besides these causes of predisposition, others may be enumerated, as hereditary or original constitution; unwholesome diet, and insufficient food; modes of living calculated to weaken and to impede the digestive, assimilative, and depurating functions; confinement in-doors, insufficient exercise, sedentary occupations, and deficient ventilation. All the depressing passions and emotions; solitary confinement, suppressed feelings, and privation of light, sunshine, and fresh air; debility and pre-existing disorder, more particularly torpor of the bowels, and of the excreting organs generally; the superabundance of excrementitial matters in the blood, or the absorption into it of morbid secretions; and either too great fulness or extreme deficiency of the blood — or vital depression and vascular plethora, or inanition, or contamination, either individually or variously conjoined, favour the operation of the more immediate causes or agents of irritation on the frame.

52. ii. *The Exciting Causes.* — The operation and nature of these, conjointly with the state of predisposition, influence and determine the form and character of irritation. — *A.* The *nature and amount of external injury*, especially in connection with the shock sustained by the œconomy on the infliction of it, often produce irritation of a serious kind, both locally and constitutionally; and the particular nature and relations of this effect are often misunderstood, and unsatisfactorily treated. Amongst these injuries, surgical operations may be classed. The nature and character of the irritation also vary much with the nature of the tissue or part primarily affected or injured. Thus a puncture or laceration of a tendon, or of an aponeurotic expansion, will more readily induce tonic spasm or tetanus than neuralgia; and the spasm will more readily be produced in a person predisposed by a combination of circumstances — by an irritable or nervous temperament, by depression of organic nervous and vital power, by accumulations of morbid secretions in the bowels, and by the depressing passions, than in a healthy individual. An irritating body, lodged either between the fibriles of a nerve, or upon its sheath, may so alter the sensibility of its sensitive fibriles as to occasion acute pain in their ramifications and terminations, even without affecting the motor nerves, or affecting them only slightly and occasionally. In many external injuries the cerebro-spinal nerves may entirely escape, and yet the extent of mischief and the shock to the system may be great. In such cases, the other structures may be seriously injured, and especially the organic nerves: these latter affect the circulation in the vessels of the injured part, and consecutively the vascular system generally; and thus extreme suffering, shock to the constitution, and vascular reaction — unless the vital powers are entirely overwhelmed by the amount of injury and the attendant shock, so as to prevent reaction — are successively produced. — In perusing

the numerous instances of surgical operations detailed in various works, the physiological pathologist will readily recognise, in many of the phenomena attending these cases, the effects of irritation caused by the operation. A man is operated upon for axillary or subclavian aneurism, and the ligature placed upon the subclavian artery necessarily produces not only a shock to the constitution, but also irritation as the shock subsides, owing chiefly to the circumstance of the organic nerves surrounding the vessel in a closely reticulated plexus being inclosed, strangulated, or irritated by the ligature. Hence the oppressed breathing, general coldness, and sinking of the vital powers, followed by febrile commotion, and various painful spasmodic and sympathetic affections, according to the peculiar circumstances of the case, so frequently consequent upon such operations.

53. *B*. Numerous *mechanical* and *chemical irritants* produce not only great local, but also, consecutively, much constitutional irritation. These, however, are generally no further injurious, than by disordering or inflaming the parts to which they are applied, unless they are so energetic as to disorganize the structure, as concentrated acids, alkalies, &c. Much of the local and constitutional irritation produced by these, unless they are thus energetic or are brought in contact with an extensive surface, is owing to the states of the system, and especially of the organic functions — deficient vital power, impure states of the circulating fluids, and impaired secretion and excretion; particularly favouring the effects of these agents.

54. *C*. Many substances combine, with much local irritation, a narcotic or *alterative effect* upon the nervous and vital properties. — *a*. These *acro-narcotics* exert a decidedly poisonous effect, characterized not merely by local and general irritation, but also by a specific condition of the vital functions. There are both a local irritation or inflammation produced by them, and a change in the states of sensibility, of irritability, and of secretion and excretion, having a special reference to the agent or cause. Most of these substances are derived from the mineral and vegetable kingdoms, and constitute, owing to their peculiar modes of action, the principal part of our means of curing disease, when judiciously employed.

55. *b*. Numerous *animal substances* occasion either local or general irritation, or both, or combine with this a contaminating or poisonous effect. In some instances their operation, locally and constitutionally, is chiefly of a septic nature, dissolving the vital cohesion of the tissues, and contaminating the circulating fluids; in others, their action is more strictly irritant, in respect either of the organic or of the cerebro-spinal nervous system, or of both, but generally of the former especially; and, again, in others, their influence is both septic, as regards the tissues and fluids, and depressing, as respects the vital endowment. Thus putrid animal matter acts principally in the first of these modes, yet partly also as a local, and, through the medium of the blood and vascular system, as a constitutional irritant. The virus of rabies affects chiefly the nervous systems, irritating, first, the part inoculated with it, and, consecutively, the organic nervous functions, and, lastly, the cerebro-spinal actions. The venom of serpents and insects both dissolves the vital cohesion of the tissues to which it is applied, contaminates them and the fluids, and remarkably depresses the vital manifestations.

56. *c*. *Acid or excrementitious matters passed into, or accumulated in, the blood* are more frequent causes of constitutional commotion or *irritative fever*, than is generally supposed. Various secretions and excretions, when accumulated or retained, are partially absorbed and render the blood impure (see art. ABSORPTION, § 15.); others, when interrupted or suppressed, are followed by a redundancy in the blood of the materials forming them, which materials are the causes of irritative fever, — of excessive action and greatly depressed vital power. *Urinous fever* or the constitutional commotion occasioned by suppressed or interrupted secretion and excretion of urine, is one of the forms of irritative fever caused by the accumulation of excrementitious or morbid matters in the blood.

57. *d*. The passage also of *morbid secretions* into the circulation, is often productive of the worst forms of constitutional irritation. If these substances pass gradually, so that their elimination from the blood is as rapid as their introduction into it, the consequent irritative fever is comparatively slight, and generally assumes a hectic or remittent form; but when it passes more abundantly and rapidly, as in cases of phlebitis and of diffusive inflammation of the cellular tissue, the constitutional disturbance is very much more serious and acute, and very closely resembles the worst forms of putro-adynamic fever. In lying-in hospitals, where the vital powers are reduced, first by the shock attending parturition, and secondly by the impure air of the ward, and when in consequence of these circumstances the uterus contracts imperfectly, or allows a considerable quantity of the bloody sanies escaping from the vessels on its inner surface to accumulate in it, a portion of this sanies is absorbed or imbibed by the veins into the circulation, and irritative fever or constitutional irritation of the worst and most rapidly fatal form is soon developed. In many of these cases, as I have proved by repeated observation and *post mortem* research, the imbibition or absorption of the matter from the cavity of the uterus, and the consequent contamination of the blood, takes place without producing uterine phlebitis, or at least without occasioning that form of phlebitis which is attended by the production of coagulable lymph in the veins (see VEINS, *Inflam. of*); whilst in others, the uterine and spermatic veins are inflamed, either primarily or coëtaneously, owing to the irritation of the matters retained in the uterus at the mouths of the veins or sinuses left exposed by the separation of the placenta, or as they pass along the veins, during the process of imbibition. The most adynamic and rapidly fatal cases are of the former description, the more inflammatory and prolonged instances are of the latter; but this important subject is fully discussed in the article on PUERPERAL DISEASES AND FEVERS, where the results of long and extensive experience are given. The rapid absorption of fluid effused into the cellular tissue, as in *phlegmasia dolens, œdematous erysipelas, diffusive inflammation of the cellular tissue*, and in cases of *non-encysted abscesses*, is generally followed by constitutional irritation of a most re-

markable kind, vascular action being excessive, but devoid of power or tone, and all the vital and nervous functions being remarkably depressed. In a case of phlegmasia dolens of both thighs under my care in 1832, the swellings very rapidly subsided, but were soon followed by all the symptoms of adynamic or typhoid fever, requiring the free use of restoratives and antiseptics, which produced a most beneficial effect and rapid recovery.

58. *e. All the animal poisons, and all the emanations produced from dead and living organized bodies,* seem to act first as local, and more or less rapidly as constitutional, irritants. The most remarkable of these is the virus or fluid sometimes inoculated when examining recently dead bodies. This poison produces excessive irritation of the nervous systems, locally and constitutionally, with extreme prostration, weakness, and rapidity of the heart's action, &c. soon followed by fatal exhaustion. But, whilst these animal or morbid poisons irritate more or less the organic nervous and vascular systems, they likewise depress their vital manifestations and contaminate the blood and secretions. They act as a kind of leaven which infects the whole œconomy, and imparts to it the power of developing a poison, like itself in all respects, capable of producing the same effects, and thereby perpetuating itself. (See arts. Infection; Poisons, Animal, &c.)

59. *f.* Numerous substances irritate the system, when received into the stomach or bowels, or passed into the circulation, each producing an effect having a strict reference to its nature or peculiar properties, and to the quantity of it taken or introduced into the blood. Indeed the operation of a large proportion of medicines depends upon this specific influence, modified, however, by a variety of circumstances, duly considered and taken advantage of by the observant and experienced physician. In cases of irritation from these causes, the local and constitutional effects vary with the tissue or viscus upon which they individually act, with their absorption or non-absorption into the circulation, with the quantity of the substance employed, and with their specific influences on the different emunctories. Substances which are absorbed, or which otherwise pass into the blood, exert, according to their nature or peculiar properties, more or less of irritation of the vascular system, and of the organs by which they are excreted from the blood, modifying at the same time the functions of the mucous and cutaneous surfaces, and the states of nervous influence. Owing to these circumstances, these agents produce more or less constitutional commotion, or irritative fever, unless their influence is slight or is limited to some excretory organ or surface.

60. *g. The sensations* when acutely excited are often causes of irritation, more especially of those parts of the cerebro-spinal nervous system with which they are in the most intimate correspondence. Thus inordinate excitement or irritation of the organs of sense is often followed by inflammatory excitement of the brain, or of its membranes; and of the nerves of sensation in the extremities, or in the general surface, by convulsions. *Morbid sensation* occasionally exerts a similar influence, or reacts upon and augments the primary irritation producing it. Acutely excited sensation may occasion, by either a direct or reflex sympathy, morbid sensations in distant parts, or spasmodic or convulsive movements, or, by exciting the vascular system, or impairing the excreting functions, constitutional disturbance of a more or less severe nature. Indeed this cause, particularly in connection with the excitement of a pleasurable feeling, as in sexual irritation, is a much more common source of the diseases of irritation, or at least of those which are thus characterized at their commencement, than is generally supposed; and it is almost equally prevalent and mischievous in both sexes. Its consequences are manifested both by direct and reflex sympathy, giving rise to disordered function, morbid sensation, disordered or uncontrollable muscular movements, and ultimately to constitutional disease. If we trace the progress of the mischief, we shall detect the effects, first, in the weakness of the various digestive functions, through the medium of the organic nervous system; next, in the cerebro-spinal nervous system, as evinced by morbid sensibility of the spinal nerves, and weakness of the mental faculties, or by affections of the voluntary and involuntary muscles, or by convulsions; and, lastly, in the augmented disorder of all these, in disease of the vascular system, in deficiency and poverty of the blood, and in various nervous, cachectic, and even structural changes, terminating in some instances in death.

61. *h.* Various *moral emotions* and *intellectual powers,* when inordinately excited or exerted, and especially the malevolent passions, anxiety, and some of the depressing feelings, excite more or less of irritation, disturb the circulation in the brain, and disorder the actions of the heart. In addition to their more strictly local effects, particularly in respect of the nervous system, they may also produce violent constitutional commotion, and derange all the secreting, assimilating, and excreting functions, this latter effect increasing still further the vascular or febrile disturbance. The mental emotion may even irritate particular organs, according to its nature, as the heart, the urinary and genital organs; and the physical effect may in its turn be a source of irritation to other parts. The mental emotion, also, may be of so violent a nature as to give rise to convulsions, or altered sensibility of remote parts, previously to vascular or other disorder of a general kind having been produced.

62. In estimating the influence of moral or physical causes in exciting local or general irritation, too great importance should never be attached to one or even two causes only, without endeavouring to detect others, or comprising the various predisposing circumstances in our pathological estimate. Every influence or occasion ought to be recognised and duly weighed; for upon the evidence we obtain of each, must a principal part of our indications of cure be founded.

63. IV. Treatment of Irritation. — The *indications,* as well as the *means,* of cure or of alleviation, of both local and general irritation, must entirely depend upon the knowledge that is obtained of the causes, of their individual and conjoint influence in producing the existing effect, and of the extent of functional or structural disease which has already resulted. It is manifest from these and other considerations, that the indications and means of cure of irritation must, in order to be appropriate and beneficial, have strict reference to the several predisposing and exciting causes, and

to the existing morbid conditions of each case. However closely observant, however experienced the writer may be, he cannot state these so as to apply to all the circumstances of such cases as they are daily occurring in practice. He can only assign those which are the most important and the most applicable to the more usual occurrences, leaving the reader to modify them, or even to add to them, according to the emergencies or the variations presented by particular instances.

64. There is no class of diseases in which the *fundamental principle* in therapeutics, of *avoiding or removing, subduing or counteracting, the causes,* is so necessary to be observed, or so difficult to be practised, as in this very important and numerous class; and none which requires greater physiological knowledge, or a more sagacious recognition of healthy and morbid sympathies as this does. Thus impressed, I have been led into a fuller exposition of the pathological relations and causes of irritation than may appear necessary to many. It seems, however, that this procedure was not the less necessary, that it was difficult, and either avoided by nearly all preceding writers, or treated of in a most empirical manner, or at least with a less strict reference to the early, the intimate, and the consecutive changes characterizing the diseased condition in question, — with a less regard to the actual procession of morbid phenomena, than the existing state of physiological knowledge warranted. In entering, therefore, upon the treatment of a case of local or constitutional irritation, it is necessary not only to ascertain fully, and to estimate justly, the predisposing and exciting causes, with the view of removing, or counteracting them; but also to trace the origin, the various relations, and the obvious and probable effects, of this condition, and to consider them in connection with the states of vascular action and purity, and of vital power or resistance, and with the *sympathies* existing between distinct organs and distant parts.

65. i. *Treatment of Irritation with reference to removing, subduing, and counteracting the Causes.*— Many of the causes admit of *removal*, others can be *counteracted* merely; and where the former cannot be accomplished, the latter must be attempted. In many cases, certain only of the causes may be removed, and the others may be either counteracted or subdued — a circumstance which should not be overlooked in framing our plan of cure. The *first part* of this indication requires no remark, but the *latter* demands further notice. In order to *subdue* or to *counteract* irritation, the *means* should be applied with strict reference to the *nature of the causes,* to the state of the œconomy, and to the *seat* and *state* of irritation. The *means* which are to be thus employed may be divided into *two classes.* 1st, Those which are strictly *local* or *topical;* and 2d, Those which act more or less *constitutionally*, or upon one or more of the general systems of the frame.

66. *A. Of the means applicable to the seat of Irritation.* — These consist chiefly of *emollients, anodynes* or *sedatives*, and *narcotics;* in some instances of *refrigerants*, of *stimulants* or *irritants*, and of *evacuants.* The former of these admit of being variously combined. It is in comparatively few cases of irritation that these means can be applied to the part primarily affected; but where this may be done, it should never be neglected. — *a.* Under the head *emollients* may be comprized all the modes of employing *moist heat*, or of conjoining moderate warmth with humidity, as the use of fomentations, warm vapour, and poultices. — *b. Anodynes* and *narcotics* are indicated chiefly *in connection with the former*, the particular agent being suggested by the nature of the cause and the seat of affection. This combination exerts a more *sedative* influence on the local disorder than either would if employed singly. Thus, warm water, vapour, fomentations or poultices, with henbane, conium, belladonna, poppies, camphor, &c., are more efficacious than those emollients used simply. It should not be overlooked, that protection from the action of the air aids many of these in their beneficial operation. — *c. Refrigerants* are much less efficacious than the foregoing in removing local irritation, although they act, like them, chiefly upon the sensibility of the part; and, in order to be useful, they should be constantly applied. Refrigerants are most beneficial when irritation is about to excite either hæmorrhage or inflammation, and they may then especially be conjoined with various *astringents* and *sedatives,* as the preparations of lead, of zinc, of opium, &c.

67. *d. Stimulants,* or even *irritants,* are sometimes useful in subduing local irritation, but it is often difficult to determine the particular circumstances in which they should be resorted to. When the irritating cause is of a poisonous, septic, infectious, or contaminating or specific nature, then stimulants, or even the more powerful irritants, are generally beneficial. Thus camphor, ammonia, the turpentines, the chlorides, the nitrate of silver, and numerous other vegetable and mineral substances are often of service, when applied to a part irritated by any of these causes. In such cases, the artificial irritant, if sufficiently energetic, supersedes the action of the morbid one, especially if it be employed before the organization of the part and the vital powers have suffered, or before morbid sympathies have been developed; and even in these circumstances they may greatly aid the constitutional means of cure. The stimulus, even of *dry heat,* may be useful in relieving irritation when judiciously employed, or conjoined with other agents. When heat is indicated purely as a stimulant, or even as an antispasmodic and sedative, these will often be most useful when applied in a dry form. The combination of stimulants with narcotics is sometimes of use, even *locally,* in many cases of irritation, attended by pain or spasm, and it will be seen in the sequel that this combination is still more beneficial when prescribed internally or constitutionally. In most cases of irritation manifested chiefly in the nervous systems, this combination is especially indicated, and is often not less efficacious when topically than when constitutionally employed.

68. *e. Evacuation* of the vessels of the part affected, or of fluid effused in the areolæ of the tissue, is often of great service in an advanced period of irritation. In such cases, distension of the capillaries and of the tissues by the effused fluid, consequent upon the action of the irritant, perpetuates the morbid state, or even increases it; and in every instance it heightens the constitutional and sympathetic effects of the local affection. This is more particularly remarkable where joints, fibrous or serofibrous structures, or deep-seated parts, or tissues

bound down by aponeuroses, are so irritated as to give rise to capillary distension, or serous effusion. In cases of this description especially, the use of emollients, anodynes, and narcotics will often beneficially follow the judicious local evacuation of the distended vessels, or of the effused serum.

69. *B. The constitutional or more general treatment of irritation* consists chiefly of the use, — 1st, of agents calculated to lower or subdue, not only the local affection, but also its sympathetic and constitutional effects, by their direct or specific operation; — 2d, of such means as will excite irritation in a particular part or viscus, and thereby supersede or reduce the primary affection; — 3d, of those medicines which stimulate, or impart tone to, the nervous and vascular systems, and thereby either subdue the local morbid condition, or enable the constitutional powers to resist it, until it subsides either naturally, or from the disappearance of its causes, or from the influence of local treatment; — and 4th, of remedies which remove injurious materials from the system, which promote the excretions, and preserve the circulating fluids in a state of purity. — It is obvious that, in the more severe and intense states of irritation especially, these several means require to be variously conjoined, and to be aided by the topical measures already advised.

70. *a. The means most useful in reducing local, or sympathetic and constitutional irritation*, are the usual antiphlogistic remedies; as low diet, abstinence, vascular depletions, refrigerants, sedatives, and physical and moral quietude. These are more particularly indicated when irritation affects the sanguine, the plethoric, and the robust, or when it has superinduced a state of sub-inflammation, or of active congestion, or of active hæmorrhage, or of simple sanguineous determination to an important viscus. In opposite circumstances, especially in the debilitated; in the nervous, melancholic, lymphatic, and irritable temperaments; in persons with a poor, or deficient or morbid state of the blood; and for those who have long suffered, or who are suffering, from depressing influences, the lowering measures now enumerated generally increase the local irritation, and even hasten and augment its sympathetic and constitutional effects. By lowering the constitutional powers, resistance to the extension of the disorder is equally weakened. In cases of this kind, the more restorative measures about to be noticed (§ 76.) are required. Where the remedies comprised under this head are indicated, the choice of them must altogether depend upon the causes and nature of the case; but generally they should be cautiously prescribed, and they should be neither repeated nor persisted in, even when indicated, without being combined with narcotics, or with antispasmodics, according as morbid sensibility or spasm may be the consequence of irritation. In cases where want of sleep, or mental irritation, attends this affection, the state of circulation in the head should receive attention; and if these symptoms are clearly not referable to increased vascular action in this quarter, then narcotics or anodynes, sometimes conjoined with alkalies, are of great service, and reduce both the local irritation and the nervous affections consequent upon it. In cases of spasm, as well as of morbid sensation, anodynes and narcotics are nearly equally serviceable; but, in the former especially, a combination of them with those stimulants, commonly called antispasmodics, is productive of great benefit. When these symptoms are violent, without vascular determination to the brain, antiphlogistic and lowering means are generally prejudicial, the opposite measures about to be noticed being the more appropriate. In the circumstances just noticed, a recourse to alkalies or their sub-carbonates, with anodynes, is often of service, particularly when the urine is thick, deposits a sediment, is acid, and when the stools are offensive, and the skin foul.

71. *b. Irritation artificially produced in an organ or part remote from the primary seat of morbid irritation*, sometimes supersedes this latter state. The principle of *counter-irritation* — of *vascular derivation* — of *artificial irritation*, &c., has been long recognised in medical practice, has been variously denominated, and various means have been used in carrying the principle into effect. It is, when judiciously prescribed, more serviceable in disorders of irritation than in any other class. The agents employed with this intention may be divided into, 1st, Those which *irritate internal organs*, and are serviceable in consequence chiefly of this mode of action. 2d, Those that are *applied externally with this intention*. — *a.* Of the *former*, (*a*) *drastic purgatives* are the most commonly used, and sometimes most beneficial. They not only give rise to an amount of irritation occasionally sufficient to supersede the original affection; but they evacuate accumulated morbid secretions or fæcal matters, which either predisposed to, or otherwise contributed to cause the disorder. Their good effects may partly, also, be imputed to the vascular determination to the digestive canal and consequent derivation from the seat of irritation produced by them. It is principally, however, when disorder is seated in parts intimately sympathising with the intestinal canal, that they are the most useful. If it is seated in the nervous centres, or if it affects sensation or muscular motion, cathartics energetically employed afford great relief, as shown in the articles on NEURALGIC AFFECTIONS, TETANUS, &c. — (*b*) *Emetics* are, upon the whole, less serviceable than cathartics; yet they are of much use for irritation of the respiratory organs, especially for hooping cough, asthma, croup, and for all spasmodic affections of the larynx and bronchi consequent upon irritation of the nerves of these parts. Of cathartics and emetics, it may be remarked, that a cautious recourse to them, — in some cases a frequent repetition of them, — is often necessary to the removal of the irritation produced by morbid secretions accumulated in the gall-ducts and bladder, or even in the cells of the colon, or in the cæcum. — (*c*) The more *irritating diuretics*, as turpentine, cantharides, &c., are sometimes decidedly beneficial in many disorders of irritation; and according to my experience, they are most so when the irritation gives rise to spasmodic or convulsive actions, as in trismus, convulsions, hooping cough, &c.; but in order to be thus useful, they should be given so as to produce a marked operation on the urinary passages. I have frequently seen a very manifest improvement of states of these diseases as soon as the urinary organs became irritated. — (*d*) *Salivation* may be considered as one of the modes of internal irritation and derivation, espe-

cially when maintained for a considerable period. Mercurial salivation is, however, more appropriate to inflammatory diseases than to disorders depending upon irritation, unless indeed the latter tend to the former character, and affect the states of vascular action either generally or locally. Irritation also, when productive of hæmorrhage, is often most successfully combatted by mercurial salivation, of a slight form, when it may be readily produced, and without having recourse to a too free exhibition of this mineral. In the slightest forms of irritation, especially those affecting parts about the face, mouth, &c., artificial excitement of the salivary glands by pyrethrum or other sialogogues may be of use.

72. *B. External derivation or irritation* has always been prescribed for disease; but, in recent times, it has been resorted to by empirics and impostors, who have employed it injudiciously and often injuriously. It is appropriate in most cases of irritation in some form and mode or other; yet much discrimination is necessary to a beneficial recourse to it, in the choice both of the irritant and of the situation to which it should be applied. The stage of the disorder, in which it is most likely to be serviceable, and the other means of cure which should be prescribed in aid of it, also deserve consideration. In the more acute and continued cases of disorder, and when it is desirable to produce an immediate effect, then the external irritants which are most energetic, as hot turpentine epithems and embrocations, mustard poultices, blisters, moxas, stinging by nettles, mustard pediluvia, &c., are also the most useful; but, in the more chronic, remittent or intermittent states, it will be necessary either to repeat these applications oftener than once, or to have recourse to others which, although slower in their operation, are more permanent in their influence on the complaint, as setons, issues, and artificial eruptions produced by croton oil, by tartar emetic ointment, or by other means. Some of these modes of producing external irritation require a few remarks.

73. *a. Epithems* of warm flannels soaked in spirits of turpentine, produce an almost immediate redness and a burning sensation of the part on which they are applied, and are especially beneficial in irritation of internal organs, in painful or spasmodic affections, and particularly when there is risk of inflammatory action or hæmorrhage being induced. They may be frequently repeated in some cases, and they then usually slightly vesicate or excoriate the surface of the part, the external inflammation thus produced soon subsiding, and they often procure a copious perspiration.—*Stinging by nettles* was formerly much used, and is an immediate and often very efficacious mode of external derivation; and is applicable to the cases for which mustard poultices are prescribed.—Mustard *pediluvia*, or mustard *manuluvia*, the water being as warm as it may be endured, and *mustard poultices*, are of service chiefly in cases of slight irritation, and before vascular excitement has been produced, or after it has been in great measure subdued. These means are seldom of much service when vascular excitement is considerable.

74. *b.* The external irritants which are slow in their action, are beneficial in consequence rather of their permanent influence, and the discharge they occasion, than of the amount of irritation or inflammatory action produced by them. This is especially the case with *setons* and *issues*, in all the various forms in which they are made or kept in action. One of the best modes of forming an issue is by applying the decorticated bark of mezereon, previously moistened, over the part selected, and by renewing the application daily, or by placing the common issue-peas under the plaster covering the denuded or ulcerated part. When it is desirable to produce a free discharge and much artificial irritation at the same time, then *open blisters*, *large issues*, or the *antimonial ointment*, may be prescribed. *Croton oil*, employed so as to occasion free pustulation, and other applications calculated to excoriate the surface and to give rise to a free discharge from it, as various combinations of concentrated acetic acid and oil of turpentine, or preparations of ammonia, are severally of use when judiciously prescribed and applied, and when aided by appropriate internal means.

75. *c.* Most of these modes of producing external irritation and derivation from the primary seat of disorder are *indicated*, either before vascular action has been excited by the primary affection, or after it has been subdued, or in a great measure subdued by suitable treatment. As long as inflammatory action exists, or as long as the primary irritation may be greater than the amount of external irritation that can be prudently excited, but little benefit will result from the practice unless the discharge procured by its means assist its influence, or compensate for the deficiency in the amount of irritation. In such instances the artificial irritation is seldom productive of that amount of vascular afflux or determination capable of being decidedly beneficial. When, however, a copious discharge is produced and maintained, the internal affection will often be removed, if it does not amount to disorganization or serious structural change; but when these changes have taken place, the amount of discharge will often only hasten the unfavourable progress of the malady, and sink the patient. In all such cases it is important to watch carefully the effects of this mode of treatment. When morbid irritation has given rise to increased vascular excitement, external irritation and derivation are seldom successfully procured. In these cases they only augment the morbid vascular action, and are prejudicial, or at least inefficacious, in proportion to the degree in which the vascular system is excited.

76. *C. The remedies which stimulate the nervous energy and impart tone to the vascular system,—a,* are generally of service in diseases of irritation when the vascular system is not materially disturbed, or when it is excited to increased action, with a diminution of power, and with evidence of a morbid state of the blood. When irritation has been followed by great frequency of the heart's action, irritability and muscular power being much impaired, and the pulse soft and open, or expansive, then the more energetic stimulants or tonics, selected with reference to the circumstances of individual cases, and conjoined with means which may promote the action of the emunctories, and counteract morbid changes in the circulating fluids, are generally of the greatest service. They increase the vital resistance to the extension of the sympathetic effects of irritation, and enable the vital energies to overcome the

primary morbid condition, or to resist its injurious influence until it subsides under the local or other means of cure, or from other influences. The several preparations of cinchona, or of other tonic barks, quinine, camphor, ammonia, the chlorate of potash, the chlorides, the alkaline carbonates, the hydro-chloric acid and ether, wine, opium, alcoholic preparations, the turpentines, Cayenne pepper, cajeput oil, &c., and the numerous remedies more particularly mentioned in the *Treatment of* TYPHOID FEVERS (§ 530.) and of DIFFUSIVE INFLAMMATIONS (§ 236.), are more especially indicated in this state of disease.

77. *b.* When irritation gives rise to *extreme pain*—to the more violent forms of neuralgia, or to *convulsive* or *spasmodic actions*, the most energetic and permanent tonics, variously combined, according to the states of the excreting viscera, are also then more beneficial than a lowering treatment; but these remedies should be aided by the most active narcotics, and by suitable local means. In such cases, brisk cathartics, followed by quinine, or the preparations of iron, or of arsenic, camphor, the alkalies, or alkaline carbonates in large doses, ammonia, &c.; and these aided by opium, morphia, henbane, colchicum, aconite, &c.; prescribed either internally or externally, or endermically, according to circumstances, are the most efficacious remedies, particularly when judiciously combined with one another, or with other medicines. Whenever pain or convulsion is violent, inflammation is not present; but the irritating cause evidently acts most energetically upon the nervous system; and the means employed to overcome or remove it should be equally energetic, and so selected and combined as to act upon the source and seat of irritation, and to remove the morbid impression made by the cause of it. In some cases particularly those of extreme pain, always affecting the same nerve, treatment is not permanently efficacious, although it is generally of temporary service, because the affection depends upon mechanical or irremoveable irritation, near the origin or in the course of the nerve. In severe cases of spasm, or of convulsion, it is, upon the whole, not much more successful; and is even almost equally hopeless when the complaint depends upon similar causes, or upon structural changes in the head, or spinal column. In all such cases, the means of cure should not be too weakening, and sanguineous evacuation should be cautiously practised, even although local plethora, or vascular determination to the nervous centres, may exist. Local depletions, or small bleedings, counter-irritation and derivation, both internal and external, tonics, anti-spasmodics, narcotics, &c. are more beneficial than other measures. Some years since, a gentleman was sent to me from the country by his medical adviser on account of neuralgia of the occipital nerves; I considered it, from the history of the case, to be dependent on a permanent cause of irritation about the base of the skull. External derivation, and the other means already advised, were prescribed, and he continued to improve for two or three years. During a visit to town, he was exposed to several sources of disorder, and in the evening he was seized with violent convulsions. The surgeon called to him bled him to a very large amount; and on the following day when I saw him, his pulse was very quick, irritable, extremely compressible, and furnishing all the indications of much excitement, with defect of power. His manner and answers to questions were hurried, quick, and unusual. I expected a return of the seizure, or paralysis, or apoplexy, in the course of a few days; but he continued to improve slightly for some months, when hemiplegia, followed by apoplexy, soon terminating life, took place. Numerous other illustrations of this principle might be adduced, if my limits could admit of them.

78. *D. Remedies which remove injurious matters, promote excretion, and correct morbid states of the blood.*—Many of the substances that evacuate excrementitial irritating matters also exert a salutary derivation, as respects the vascular afflux or determination. The old doctrine, "ubi irritatio ibi fluxus," is correct in all situations, and in every sense; and particularly when the irritant is applied to mucous surfaces, and acts upon excreting glands. During many states of irritation, particularly when vascular action is materially excited by it, absorption is remarkably active, and morbid secretions accumulated either in the biliary passages, or in the intestines, especially in the cells of the colon and cæcum, are more rapidly, than in other circumstances, conveyed into the circulation, thereby either favouring the production of, or actually producing, constitutional disturbance of a serious nature consecutively upon the local irritation. The more stomachic, tonic, and alterative purgatives are essentially necessary in such circumstances, particularly combinations of the compound infusions of gentian and senna, with alkaline carbonates; the spirits of turpentine, with or without castor oil; and other medicines which produce a restorative, as well as an evacuant effect. In all instances of impaired excretion, or of excrementitial accumulations in the circulating fluids, either contemporaneous with, or consequent upon, local or constitutional irritation, the exhibition of stomachic purgatives, and the alternation of the more powerful tonics, are extremely serviceable. In this state of actual disease, the chlorate of potash, the chlorides, hydrochloric æther, camphor, ammonia, the alkaline carbonates, and, when vascular action is excited, the nitrate of potash, the solution of the acetate of ammonia, and other stimulants, either separately, or preferably in conjunction with quinine, or with tonic infusions or decoctions, or with one another, according to their several compatibilities, will be found most beneficial, provided that the actions of the emunctories be at the same time duly promoted, and morbid accumulations evacuated. In cases where irritation is attended by accumulations of excrementitial matters in the blood, not only should the bowels be freely acted upon by the means just mentioned, but the kidneys ought to be excited by the more energetic diuretics, as the turpentines, the alkaline carbonates, the nitric or hydro-chloric æthers, &c. When local, or even constitutional irritation, is attended by deficiency of blood, or by a deficient proportion of hæmatosine, then the preparations of *iron*, with alkaline solutions, as the mistura ferri composita, or the ferri ammonio-chloridium, the ferri potassio-tartras, &c. will be requisite, in addition to the other means which the circumstances of individual cases will suggest.

79. *E. Alteratives* and *deobstruents,* either

alone, or conjoined with gentle restoratives, or with mild tonics, or with laxatives or aperients, are of the greatest service in the more chronic and slight forms of irritation. The most useful of these are Plummer's Pill, either alone or with soap and extract of taraxacum; the hydrargyrum cum creta, similarly prescribed; the liquor potassæ, or Brandish's alkaline solution, with any of the concentrated preparations of sarsaparilla, or with taraxacum; and the solution of potash, with the hydriodate of potash. The sub-borate of soda, either alone or with the bitartrate of potash, or both these with taraxacum, are of service for irritations of the biliary organs. A combination of several of the foregoing medicines with camphor, henbane, belladonna, or conium, or with any of the preparations of opium, according to the peculiarities of particular cases, is often beneficial, especially when irritation is attended by increased sensibility. When there is much irritation of the cutaneous surface, the alkalies and their carbonates, camphor, prussic acid, the narcotics just enumerated, with emollients, &c., employed both internally and externally, should never be overlooked.

80. *F. The diet and regimen* of diseases of irritation require much attention. Whilst vascular action continues excited, the *diet* should be mucilaginous, or farinaceous; light and cooling, and suited to the powers of digestion and assimilation. If, however, the vascular system be not materially affected, and the functions of the stomach are not much impaired, a small proportion of light animal food may be allowed. In the more serious states of constitutional irritation, especially where there is marked asthenia, and a disposition to changes in the state of the blood, wine and even alcoholic stimulants are often necessary, in aid of the means above recommended, in order to limit, or to prevent the extension of the mischief, by exciting the several vital endowments. In these cases, the diet should consist chiefly of such articles as are desired or relished by the patient, as being the most likely to be digested without disordering the system.

81. Change of *air*: residence in a pure air, exercise taken regularly and short of fatigue, travelling, the use of those *mineral waters*, both internally and externally, that contain the alkalies and alkaline carbonates and carbonic acid; the waters of Bath, Ems, &c., are usually beneficial; but mineral springs should be prescribed with a strict reference to the specific forms of these complaints, after a due experience of their operation, and without being influenced by prejudices, by fashion, by guide-books, or by local interests. In many diseases of irritation, the factitious mineral waters prepared at Brighton have proved of great benefit, even in the range of my own experience, having frequently prescribed them since 1824. In most cases, however, much discrimination is requisite to the procuring all the benefits they are calculated to afford. In most instances, the milder waters, as those of Ems, of Saratoga, or of Salzbrunnen, should be first prescribed; and subsequently the more tonic waters of Kissengen, Marienbad and Carlsbad, or of Eger, Pyrmont, or Spa, having recourse occasionally to the waters of Seidschutz or Pulna, when the bowels are torpid, or the biliary functions impaired or obstructed. Several of these waters, also, may be procured in London; and at Brighton their effects may be aided, in the cases that require it, by warm salt-water bathing.

Bibliog. and Refer. — *De Magny*, An à Vasorum aucta aut imminuta Irritabilitate omnis Morbus? 8vo. Paris, 1752.— *G. Verschuir*, De Arteriarum et Venarum Vi irritabili, ejusque in Vasis Excessu, et inde oriunda Sanguinis Directione abnormi. Groning. 1766. — *Baldinger*, De Irritabilitate Morborum Genitrice. Jen. 1772. — *A. Grant*, Observat. on the Use of Opium in Dis. of Irritability. 8vo. Lond. 1785. — *I. L. Gaultier*, De Irritabilitatis Notione, Natura et Morbis. 8vo. Hal. 1793. — et Physiologie und Pathologie der Reizbarkeit. 8vo. Leips. 1796. — *Marcard*, Beschreibung von Pyrmont, b. ii. p. 107. — *M. Maraudal*, Essai sur les Irritations. 4to. Paris, 1807. — *Consbruch*, in *Hufeland*, Journ. der Pract. Heilkunde, b. xiii. 3 st. p. 43. — *I. G. F. Henning*, Ideen über Idiosyncrasie und Krankliche Reizbarkeit. 8vo. Gotha, 1812. — *Humboldt*, in Mémoires de la Société Médicale d'Emulation, t. i. p. 302.; t. ii. p. 323. — *Monfalcon*, Dict. des Sciences Médicales. t. xxvi. — *P. I. Mongellaz*, Essai sur les Irritations intermittentes. 8vo. Paris, 1820. — *F. T. V. Broussais*, Traite de Physiol. appliqué à la Pathologie. 8vo. Paris, 1822. — et Examen de Doctrines Médicales généralement adopté. 8vo. Paris, 2d ed. 4 vol. 1829. — et de l'Irritation et de la Folie. 8vo. Paris, 1828—*I. M. Goupil*, Exposition des Principes de la nouvelle Doctrine Médicale. 8vo. Paris, 1824. — *Charpentier*, In Journ. Génér. de Méd. t. lxxxvi. p. 6. 145. — *J. Butler*, Remarks on the Irritative Fever of Plymouth Dock-Yard. 8vo. Devonport, 1825. — *Coutanceau*, Dict. de Médécine. 8vo. Paris, t. xii. — *V. Prus*, De l'Irritation et de la Phlegmasie. 8vo. Paris, 1825. — *B. Travers*, Inquiry concerning Constitutional Irritation. 8vo. Lond. 1826. — Also a Further Inquiry concerning Constitutional Irritation, and the Pathology of the Nervous System. 8vo. Lond. 1835. — *Roche*, Dict. de Med. Pratique, t. x. — *R. Williams*, Elements of Medicine, vol. i. On Morbid Poisons. 8vo. Lond. 1836. — *C. B. Williams*, Cyclop. of Pract. Medicine. 8vo. Lond. vol. ii. p. 875.

ISCHURIA. *See* Urine.

ITCH. — Syn. *Psora*, *Ψώρα* (from *Ψαω*, I rub or scratch), *Scabies* (from scabo, I scratch). *Phlysis scabies*, Young. *Ecpyesis scabies*, Good. *Scabiola*, Auct., Lat. *Krütze, jucken der haut, zaude*, Germ. *Gale, rogne*, Fr. *Rogna, Scabbia*, Ital. *The Scab.*

Classif. — iv. *Class*, viii. *Order*, (*Cullen*). 6th *Class*. 3. *Order*, (*Good*). III. Class, I. Order (*Author* in *Preface*).

1. Defin. — *An eruption of distinct, slightly acuminated vesicles, accompanied with constant itching, caused by contagion, the eruption being occasionally modified in character at its appearance, or during its progress, and unattended by constitutional disturbance.*

2. Recent writers have supposed that the eruption mentioned by Galen, under the name of *Ψώρα*, was really the itch; but his description of it is more applicable to squamous than to vesicular eruptions. The description also which Celsus has given of *scabies* is by no means distinctive of itch, and is more characteristic of prurigo than of it. Neither these writers nor Avicenna mention contagion as attending the eruption thus named by them. Guy de Chauliac, according to Rayer, was the first to point out this important feature of the disease. Subsequent writers have generally noticed it, although several of them have not distinguished between itch and prurigenous affections. More recently Willan, Bateman, Biett, and Rayer, have given the history of this eruption with much precision.

3. The modifications occasionally presented by the itch, both on its appearance and during its progress, have led to some difference in the classification of it. Thus it sometimes assumes from its commencement a *papular* form, and during its course a *pustular* character. Hence Willan and Bateman arranged its varieties accordingly

and placed it among the *pustular eruptions*, the varieties being the *Papuliformis*, *Lymphatica*, *Purulanta*, and *Cachetica*. MM. Biett and Rayer, however, have more accurately classed it with *vesicular eruptions*, the vesicular form being its primitive and most common state; still it sometimes appears as a *papular eruption*, and as such Dr. Paget has arranged it. I shall here consider the disease as *commonly vesicular*, and the *modifications* orv *arieties* presented by it as accidental or contingent upon the peculiarities or circumstances of individual cases.

I. Description. — This eruption generally appears first on the hands, between the fingers, on the wrists, on the flexures of the joints, on the abdomen, and on the insides of the limbs. It is most commonly confined to a surface of no very great extent; and, in some cases, consists only of a few vesicles dispersed between the fingers and over the wrists; but it may affect the skin very generally. It does not occur on the face or on the scalp. It is essentially a contagious disease, and is neither epidemic nor endemic.

4. 1st, *Of its common vesicular form.* — The eruption generally takes place in *children* at the end of four or five days from the period of contagion; but this is uncertain, for in weak or delicate children it may be delayed beyond this period, whilst, in the plethoric and sanguine, it appears even earlier. It seldom occurs in *adults* before eight or ten days have elapsed, in spring and summer, or before fourteen or twenty days in winter. It is longer in appearing in the aged than in the young or middle-aged, and it attacks in preference the situations where the skin is most delicate.

5. The eruption commences with itching, at first slight, of the parts which have been exposed to contagion. The itching is increased through the night by the warmth of the bed, by indulgence in stimulating food, beverages, and spices, and by whatever heats or determines the blood to the surface. A number of small points or spots, very slightly elevated above the surface, now appear, and present a pale rosy colour, with small acuminated vesicles on each point or spot. If the vesicles be few, they occasion but little puritus, and preserve longer their primitive form; but if they be numerous, the skin between each participates in the irritation, and the itching becomes urgent. The vesicles are then usually torn by the nails, and allow their viscid serous contents to escape, which concrete and form small thin scabs, slightly adherent to the skin. If the scratching has been violent, the scabs are black, and resemble those of prurigo.

6. ii. *Varieties or modifications.* — Owing to peculiarity of constitution, to the amount of inflammatory action attending the eruption, to the depth to which it extends in the tissues composing the skin, and to the existing state of health of the patient, itch presents certain modifications which have been arranged into species by Willan and Bateman. — *A.* The variety denominated by them the *Scabies Papuliformis*, or *rank itch*, is that in which the eruption is more papular and inflamed at the base, but still presents a transparent apex, indicating its vesicular character. When much irritated by scratching, long red lines are left here and there, and the fluid exuded from the abraded vesicles concretes into little brown or blackish scabs. In sanguine temperaments, and when much irritated, a few of the vesicles assume a pustular form, from the fluid contained in them changing to a purulent matter.

7. *B.* The *Scabies Lymphatica*, or *watery itch*, differs from the foregoing chiefly in the absence of the papular character and of inflammatory redness, and in the larger size of the vesicles. When the vesicles are ruptured by scratching them, moist excoriations often form, and, after a time, dark scabs. This variety usually presents three stages; viz. the entire vesicle, the excoriation consequent on its rupture, and the scab covering the excoriated part. It is not so frequently observed as the former variety on the trunk, but is most commonly found collected on the lower parts of the extremities, as the fingers, wrists, backs of the hands, and sometimes on the feet and toes.

8. *C.* The *Scabies Purulenta*, or *pocky itch*, is more distinct than the other varieties. The round pustules into which scabies, in a few instances, forms itself, resemble the pustules of small-pox. They occur chiefly in children and young persons, who have been living on a heating diet, and who have been inattentive to cleanliness. These pustules are distinct, with an inflamed base, and considerably elevated; they maturate and break after a few days, having then often attained a diameter of two or three lines. The itching occasioned by them is attended by more tension and smarting than that of the other varieties. After they break they often leave a cracked excoriation or ulceration behind, or small fissures between the scabs, the stiffness and heat of which cause considerable uneasiness. The pustules rarely appear on the trunk; but usually on the hands, between the fingers, or near their flexures, more rarely on the feet and at the bends of the arms. They are largest on the hands and between the knuckles, especially between the index finger and thumb; they often coalesce, and in these situations more especially, slight fissures or cracks form in the concretions covering the excoriations or seats of pustulation. This variety, in plethoric children, is sometimes attended by slight febrile commotion.

9. *D.* The *Scabies Cachectica*, or *scorbutic itch* of Willan, is not, strictly, a variety, but merely an imprecise modification, produced by debility and general cachectica, inconsequence of intemperance, poor living, and unwholesome food, that assumes no very distinct or unvarying character. As may be expected, from the circumstances in which it occurs, it is the most aggravated state of the eruption; and is more frequently than the true varieties, either form of which it may assume, *complicated* with other eruptions, particularly with *lichen*, *prurigo*, *ecthyma*, and *impetigo*. When itch occurs in the *dark races*, it generally presents this state, and is severe and obstinate — is *rank* and extensive, spreading rapidly over the body. As thus met with, it has been noticed by Bontius, and by Sauvages, who called it *Scabies Indica*.

10. *E. The Complications of itch* often render the diagnosis difficult. *Ecthyma* is sometimes associated with it, and more rarely *eczema*, but is chiefly cured by the use of stimulating washes or ointments. Scabies is most frequently complicated with *papular eruptions*, particularly with *lichen*, in

the young, and when the vesicles are generally or abundantly disseminated. *Prurigo* is often associated with itch in the more prolonged cases. *Boils* occasionally appear in the more severe instances. These complications, as well as a pustular state of the eruption, are favoured by living on salt, acrid, and fat meats, and by acrid applications to the surface. Disórders of the digestive organs sometimes prevent the full evolution of itch; or persons subject to these disorders, who have caught this affection, often readily recover from it, when such disorders are aggravated by errors of diet. *Scrofula* does not materially modify scabies. In very unhealthy or cachectic subjects, it sometimes assumes a livid hue; and, when its vesicles are crowded in any part, they are occasionally associated with *ecthyma cachecticum*.

11. *F.* The *duration* of this eruption depends upon treatment. If left to itself it never gets well; and may even continue through life when thus neglected. In southern climates, and in spring and summer, and in young, plethoric, and robust persons, the vesicles of itch run rapidly through their successive changes when not broken by scratching; but their progress is much slower in the north, in winter and autumn, and in the bilious, melancholic, and cachectic, and in the aged and infirm,—in whom, also, it is longer in appearing after infection. When it is judiciously treated, and with strict attention to cleanliness and to the state of the linen and clothes, it may be cured, in very recent cases, in five or six days, and in the worst cases, in from ten to fourteen days to three weeks; but it may be protracted beyond this period, in the old, infirm, and cachectic; or when it has been long in appearing. In some rare instances, it disappears on an attack of an internal inflammatory disease, and returns again when that disease is removed. This circumstance, however, has been doubted, some other eruption having been mistaken for the itch. In general this eruption exerts no influence upon internal complaints, nor do they produce any effect on it; although an opposite opinion has been long held by pathologists, and is still entertained by a few.

12. II. DIAGNOSIS. It is of importance, not only as respects the reputation of the practitioner, but as regards the speedy recovery of the patient, and the protection of the other members of the family to which he belongs, that a correct diagnosis between this eruption and those which so closely resemble it should be made.—*A. Prurigo* is most frequently confounded with the itch; but, independently of the former being papular, whilst the latter is vesicular, prurigo is usually seated on the back, shoulders, and on the outsides of the limbs, or on the surfaces of extension; whilst the itch is observed chiefly on those of flexion, on the wrists, and between the fingers. Prurigo, also, occurs more frequently in adults and elderly persons than itch, its papula are flat, and when abraded, a black spot of blood concretes on their centres. The itching attending prurigo is more vehement than that of scabies, more stinging or smarting, and less pleasurable. The former, also, is not contagious.

13. *B. Lichen simplex* most closely resembles the papuliform variety of itch. In the former no vesicles can be detected in the summits of the papulæ, which pass away in a scurvy exfoliation; and do not give rise to dark scabs. Lichen appears on the backs of the hands and on the external surface of the limbs, and hardly ever between the fingers. The itching attending it is not severe, and the papulæ preserve the tint of the skin, whilst the vesicles of scabies are of a pale pink; the former being generally crowded together, the latter being much more distinct. Lichen is commonly accompanied with some constitutional disturbance; but it is not contagious. The *lichen urticatus* is more acute, and sometimes presents a few vesicles among the papulæ; but its inflamed wheal-like papulæ, and the deep tingling rather than itching, sufficiently distinguish it.

14. *C. Eczema*, particularly *C. Simplex*, may be confounded with itch; but in the former the vesicles are flattened and agglomerated in greater or less numbers, whilst in the latter they are acuminated and generally distinct. The itching of eczema is a kind of general smarting, or stinging, very different from those exacerbations characterising itch. The former is usually produced by exciting or irritating causes, the latter by contagion only.

15. The association of scabies with other eruptions is of importance in the diagnosis. Such complications may be merely accidental, but they occasionally arise from the irritation of scratching, and of applications to the eruption. Vesicles of itch, pustules of impetigo or of ecthyma, and furunculi are sometimes met with in the same patient. The papulæ of Lichen also may be either contemporaneous with itch, or consequent upon it. Scabies may even coexist with syphilis, without having its characters thereby modified, further than has been noticed when mentioning the variety called cachectica. These combinations generally retard the cure, as well as often increase the difficulty of diagnosis.

16. III. CAUSES. The great, and perhaps only, cause of itch is contagion. The only questions are, whether it does, in any circumstances, arise spontaneously, and what is the nature of the infecting substance or body? These will be answered in the sequel, as far as the state of our knowledge admits of answers. Scabies is one of the most universally disseminated contagious diseases, the momentary contact of the fluid secreted by its vesicles being sufficient to communicate the infection. It occurs in every climate, in every season, in all ranks and ages; but is most common in the poor and wretched, in persons negligent of cleanliness; in sailors, soldiers, in work-people, dealers in old clothes, in tailors; and especially in those crowded in jails, hulks, barracks, workhouses, and factories. It rarely is observed in tanners, in dyers, and blacksmiths, or in the families of the affluent. It always spreads in consequence of contact, immediate or mediate; and of want of cleanliness.

17. Several instances of itch transmitted from animals to the human species have been cited; but most of the diseases thus named are inaccurately described, and are of a very doubtful character. M. MOURONVAL adduces cases of the communication of itch from the dog to man; but M. RAYER states that M. LEBLANC showed MM. SABATIER, LITTRÈ, and himself, dogs labouring under a disease called itch, consisting of a number of small acuminated vesicles, resembling those of scabies in the human subject; and stated that the man who attended them had not been infected by them, although they communicated the disease

to their own species. This however is no satisfactory proof of the non-communicability of the affection from the dog to man. Mr. Youatt, whose authority in this matter is the best possible, informed the author that the itch may be communicated to the dog, and by the dog to man and other animals, but that it is never sporadic in the canine race.

18. Avenzoar, and long subsequently Ingrassias and Jobert, hinted at the existence of an *insect* in the vesicles of itch: but Mouffet first mentioned it in his *Theatrum Insectorum*, in a particular manner. Several recent authors have described it under the name of *Acarus scabiei.* Hauptmann first published a figure of it, and represented it with six feet. Redi put the existence of this insect beyond doubt, and, aided by G. Lorenzo and H. Cestoni, examined numbers of them, having removed them from the vesicles. Dr. Bonomo gave the following description of it. This insect moves with great vivacity; has six legs, and a pointed head, armed with two small horns or antennæ at the extremity of the mouth. It is, he remarks, difficult to distinguish these insects on the surface of the body, owing to their minuteness and to their colour resembling that of the skin. They first insinuate their pointed heads, and then move about gnawing and pushing until they have buried themselves under the cuticle, where they form a kind of covered way of communication between one point and another, so that the same insect generally causes several watery pustules. The above physicians also discovered the eggs of these insects, and even observed their extrusion from the hinder part of the animal. The eggs are white, nearly quite transparent, and hardly visible. These insects, they remark, pass readily from one person to another by mere contact, for being very active, and often on the surface of the skin, they readily attach themselves to whatever they touch.

19. Morgagni, Linnæus, De Geer, Wichmann, Waltz, and others confirm the above description; but, nevertheless, the existence of these insects having been called in question, M. Galés took up the subject, and his investigations, which were witnessed by many members of the Institute, further confirmed the above statement. The circumstance of Galeotti, Chiarugi, Biett, Lugol, and Mouronval having failed in finding these insects, occasioned fresh doubts of their existence; but their failure arose from having sought for them in the vesicles. Mouffet had long before stated that they are not found in the pustules, but by their sides; Casal had made nearly a similar observation; and Dr. Adams remarks that they are not found in the vesicle, but in a reddish line going off from one of its sides, and in the reddish and firm elevation at the extremity of this line, and at a little distance from the vesicle. Mr. Plumbe supposes that the insect is unable to live in the fluid of the vesicle, which is the result of the irritation it causes, and therefore escapes from it. Finally, M. Renucci, a medical student from Corsica, showed, in 1834, the physicians of Paris the mode of discovering this insect; which is the same as that formerly stated by Dr. Adams. Since this time, M. Rayer remarks, the existence of the *acarus* of the itch has been placed beyond a doubt. MM. Lemery, Gras, and Renucci had each shown him the mode of detecting it, and he had himself extracted several. M. Raspail has given an excellent description and figures of it; and M. A. Gras has entered into researches as to the share it has in producing this eruption. Although it has been proved that, in almost all who are affected with scabies, and who have not been subjected to treatment, a certain number of subepidermic furrows containing acari are to be discovered, it is also undoubted that the number of these furrows and of these insects bears no proportion to that of the vesicles. It is, further, rare to discover these insects on the abdomen and groins where the eruption is nevertheless very common and apparent; and, moreover, scabies is known to continue where no more acari are to be found. The experiments made to ascertain whether or not the *acarus* be the *cause* of the itch, or a parasite produced by it, are not altogether conclusive.

20. IV. Treatment. As the itch is never spontaneously cured, but may continue even for many years, the treatment should be decided and unremitting. The experiments lately made by M. Gras have thrown much light upon this subject. They prove that a concentrated solution of the *hydriodate of potash* kills the *acarus* of scabies in the shortest time — in from four to six minutes; and he considers that *an ointment, consisting of half a drachm of this substance to an ounce of axunge*, is the best remedy for the itch. I have prescribed this ointment in several instances, and have found it the most speedily efficacious. This physician states that the itch-insect lives sixteen hours in the vapour of burnt sulphur; three hours in water; two hours in olive oil; one hour in the acetate of lead; one hour in pulverised brimstone; three quarters of an hour in lime-water; twenty minutes in vinegar and spirits of wine, and twelve minutes in a solution of sulphuret of potash.

21. Where scabies is uncomplicated and recent, its cure is readily accomplished by local applications, and without any preparatory or constitutional means; but where it is of old standing, and associated with other eruptions, or with an inflammatory state of the skin, and particularly if the patient be young and plethoric, a bleeding from the arm, soothing lotions and simple baths may be premised. Frictions with the *sulphur ointment* (*sulph. sublim. loti* ℥viij. *adipis præp.* ℔j.), or with either of the *compound sulphur ointments.* (*sulph. subl.* ʒij. *potassæ subcarb.* ʒj. *adipis* ℥j., or *sulphureti calcis* ʒj. *adipis* ℥j.), usually cure scabies in ten or fourteen days. The compound sulphur ointment is the next to the ointment with hydriodate of potass in efficacy. M. Rayer advises the compound sulphur ointment in the quantity of two ounces daily, to be rubbed over all the parts affected, the patient's skin having been well cleansed with soap and water. The rubbing should be continued diligently for about half an hour, morning, midday, and at night. If this be continued unremittingly, the eruption may be cured in six or seven days. Helmerich prescribed four ounces of the compound sulphur ointment to be assiduously rubbed on the parts affected in the twenty-four hours. An ointment, consisting of *sulph. sublim. loti* ℥iij., *ammon. hydro-chlor.* ʒij. *adipis præpar.* ℥xiij. is also an efficacious application. M. Derheims has found the solution of *chloride of lime,* ℥j. in water Oj., and used twice or thrice daily, very efficient.

22. The plan of M. Pyhorel, to add half a

drachm of the sulphuret of lime to a little olive oil, and with this to rub the palms of the hands during a quarter of an hour night and morning, is also efficacious. *Sulphureous washes*, as that composed of *potassæ sulphureti* ℥j., *aquæ* ℔ iij., of which an ounce is to be added to four ounces of warm water, and applied to the affected parts, also speedily effect a cure. These washes do not soil the clothes like ointments, but they often cause vesicular and papular eruptions. Should these eruptions appear or complicate the itch, irritating frictions and applications must be suspended, and tepid emollient baths prescribed. In all cases of scabies, a few tepid baths should follow the removal of the eruption.

23. *Alcoholic saponaceous washes, acid ointments and washes, artificial sulphureous baths, sulphureous fumigations*, &c., and various other means have been recommended for the cure of itch; but they are less certain than the above, require a longer period, and are more expensive. Washes and ointments, the basis of which are *nitric acid* and *mercury*, have occasionally produced salivation and disturbance of the digestive organs. The *internal use of sulphur*, or this conjoined with its external application, has been long employed in this country; and is efficacious and well suited to the purulent form of scabies, as met with in children. *Hellebore* and *tobacco* have also been recommended for the cure of itch, and are doubtless efficacious; but they are hazardous substances, particularly where there is much excoriation, and when prescribed for children.

24. Where itch is associated with general cachexia, and is modified by this circumstance, a judicious internal treatment should be conjoined with external applications, and with warm or tepid baths. In these cases the *liquor potassæ* may be taken with sarsaparilla, or the alkaline carbonates may be given with mild tonics; and an alterative dose of a mild mercurial may be prescribed occasionally at bedtime. This treatment, in addition to the specific external measures already mentioned, is also requisite when itch attacks the *dark races*, among whom it generally proves a much more severe and obstinate affection than in the white races.

25. During the treatment, the *diet* should be digestible and in moderate quantity. All acrid, heating, and fat articles, as well as stimulating beverages, should be avoided. In order to prevent a return of the eruption, and its spreading in a family, the body and bed-clothes of the patient ought to be subjected to disinfecting processes, as the fumes of sulphurous acid gas. The linen should be changed frequently, and the greatest attention paid to cleanliness.

Bibliog. and Refer. — *Celsus*, lib. v. cap. 28. — Novus Index in omnia quæ extant Cl. Galeni Opera. Fol. Basil, 1562; art. Psora, Scabies. — *Guy de Chauliac*, Des Signes de Scabie, &c. trad. par *J. Canappe*. 8vo. Lyons, 1609. — *Willis*, Pharmac. Ration. Par. 1. s. 3. cap. 6. — *Mouffet*, Theatrum Insectorum. Fol. Lond. 1634. — *Bontius*, De Med. Indorum, lib. iii. cap. 17. — *G. C. Bonomo*, Sur les Cirons ou Insectes de la Peau des Galeux, in Collect. Académ. E'trangères. 4to. t. iv. p. 574. — *Bonomo* by *Mead*, in Philosoph. Trans. vol. xxiii. 1702. — *Plenck*, Doct. de Morb. Cut. p. 42. *Roederer*, De Scabie, 1710. — *Ettmuller*, De Scabie Programma. 8vo. 1731. — *Helmich*, De Usu Interno Olei Vitrioli dil. in nonnullis Scabiei Speciebus, 4to. 1762. — *G. Casal*, Historia Natural y Medica de el Princip. de Asturias. 4to. Madrid, 1762. — *Morgagni*, De Causis et Sed. Morb. lib. iv. ep. 55. — *De Geer*, Mém. pour servir à l' Hist. des Insectes. 4to. Stockh. 1778. — *Turner*, Treat. on Dis. of the Skin. ed. 4. p. 58. — *Pentzlin*, in Brit. and Foreign Med. Rev. Oct. 1837, p. 514. — *Wickmann*, Ætiologie der Krätze. 8vo. Hanover, 1786. — *Adams*, On Morbid Poisons. 4to. Lond. 1807. p. 299. — *F. I. Becu*, Mém. sur la Décoction du Tabac, empl. au Trait. de la Gale, vide Recueil Periodique, &c. t. i. p. 60. — *Ranque*, Mém. et Observ. Cliniques sur un Nouv. Procédé pour la Cuérison de la Gale. 8vo. Paris, 1811. — *Le Roux*, Traité sur la Gale, &c. 12mo. Paris, 1809. — *J. P. Frank*, De Cur. Hom. Mob. t. iv. p. 165. — *Galé*, Essai sur le Diag. de la Gale, sur ses Causes, &c. 4to. Paris, 1822. — *T. Bateman*, Pract. Synopsis of Cutaneous Diseases. 7th ed. by *A. T. Thompson*, p. 280. — *Mouronval*, Recherche et Observ. sur la Gale, &c. 8vo. Paris, 1821. — *Lugol*. Rech. et Observ. sur la Gale. 8vo. Paris, 1821. — *Helmerich*, Méthode pour guérir la Gale en deux Jours, par *J. Burdin*. 8vo. Paris, 1822. — *Plumbe*, On Dis. of the Skin. 8vo. Lond. ed. vol. ii. p. 306. — *Cazenave* et *Schedel*, Abrégé pratique des Mal. de la Peau. 8vo. Paris, 1828. — *Derheims*, Journ. de Chim. Médicale, Dec. 1827. — *Houghton*, in Cyclop. of Pract. Med. vol. iii. p. 633. — *J. Green*, Pract. Compendium of Diseases of the Skin. 8vo. Lond. 1835, p. 63. — *P. Rayer*, Theoretical and Pract. Treatise on Dis. of the Skin. trans. by *R. Willis*. 8vo. Lond. 1835, p. 387. — *Remuir*, in Lond. Med. Gaz. Oct. 1834, p. 29. — *Raspail*, Mém. comparatif sur l' Hist. Naturelle de l'Insecte de la Gale. 8vo. Paris, 1834. — *A. Gras*, Rech. sur l'Acarus de la Gale de l' Home. 8vo. Paris, 1834. — *Fantonetti*, in Archives Génér. de Med. t. xxx. p. 407.

KIDNEYS. — The Diseases of. — 1. Our knowledge of the diseases of the kidneys has been recently very much advanced and rendered more precise by the researches of Drs. Bright, Prout, Christison, Gregory, Willis, Osborne, Rayer, and others. In the present article will be discussed the *diseases of which these organs are the only or principal seats*; and, in that devoted to the consideration of the *urine*, *those disorders in which the kidneys and other urinary organs are functionally disturbed*. The great importance of an early attention to the disorders, and more especially to the actual diseases, of these organs, especially in relation to several consecutive maladies, and to various pre-existing changes of the digestive and assimilative functions, and of the circulating fluids, has become very manifest since the researches of Dr. Bright disclosed to us some of the most interesting, most common, and most fatal, of the lesions, to which the kidneys are liable.

2. The causes of diseases of these organs do not for the most part act immediately upon them. Intimately associated with the digestive and assimilative viscera through the medium of the ganglial or organic nerves, with the circulating organs by the states of the blood, and with the cerebro-spinal nervous system, by means of the spinal nerves communicating with the renal ganglia and plexuses, the kidneys are liable to be deranged sympathetically, or indirectly, during the progress of the various disorders and maladies, by which these important parts of the human frame are affected. As the chief emunctories of effœte and hurtful materials, the ultimate product of assimilation, that are liable to accumulate in, and require to be carried out of, the circulating fluids, the kidneys are disturbed by the superabundance and peculiarities of these materials. Eliminating these various elements and substances existing in the blood circulating through them, by means of the nervous influence conferred on them, chiefly by the ganglia and plexuses which supply and endow them; and combining these elements into new forms, frequently of an irritating and hurtful nature, they are liable to disorder from causes which may diminish, excite, or otherwise modify this influence, or interrupt the excretion of the fluid and saline matters, that they are destined to accomplish. Intimately associated,

moreover, with the other organs eliminating from the circulating mass, materials of an irritating or otherwise hurtful tendency, they are liable to disorder, sometimes of a vicarious character, from causes acting upon the organs thus associated with them in function, although in other respects remotely connected with them, and from diseases affecting the organisation or functions of those parts: thus are the kidneys affected by causes acting upon the skin, lungs, liver, digestive canal, and generative organs; by diseases affecting the functions and organisation of those several viscera; and by morbid conditions of the system in general, or of the nervous and vascular systems in particular.

3. These are circumstances calculated to increase the difficulty of the study of the diseases of the kidneys; and it should not be concealed that there are causes which add to this difficulty. Amongst these, the low degree of sensibility with which the internal structure of these organs is endowed: their situation — protected in one direction by a firm and unyielding mass of muscles, &c., and surrounded in all the rest by various viscera; and the changes which their secretion undergoes in the parts through which it passes or accumulates, deserve due consideration; and should impress the mind of the physician with the importance of a diligent investigation of the phenomena, and of caution in forming his opinion as to the nature, of the affections referrible to these organs, as the only guides by which the *indications* and the *means* of cure can be safely directed.

4. It is, perhaps, owing to these causes of difficulty that the disorders and morbid changes to which the kidneys are liable; the signs and symptoms by which they are indicated; and the means most efficacious in their removal, have made so little progress until recently; and still require, notwithstanding the advances which have been lately made, so much further elucidation. In the present consideration of the *diseases of the kidneys*, I shall first describe the *inflammatory diseases*, and their pathological and therapeutical relations; and afterwards notice the *changes, chiefly structural*, consequent upon these, and upon other disordered states.

I. INFLAMMATION OF THE KIDNEYS. — SYNON. — *Nephritis.* — Νεφριτις, Hipp., Galen, (from Νεφρος, the kidney.) — *Renum Inflammatio*, Sennert. *Phlegmone renum*, Prosper Alpinus. *Cauma Nephritis*, Young. *Empresma Nephritis*, Good. *Inflammation des Reins, Nephrite*, Fr. *Nierenentzündung, entzündung der Nieren*, Germ. *Nefritico, Inflammazione di reni*, Ital.

CLASSIF. — 1. *Class;* 2. *Order* (*Cullen*). 3. *Class;* 2. *Order* (*Good*). III. CLASS, I. ORDER (*Author* in *Preface*).

5. DEFIN. — *Pain in the lumbar region, often extending anteriorly through the abdomen, or descending to the groin and testes, with retraction of the latter, disordered state of the urinary secretion and excretion, febrile disturbance, sometimes numbness of the thigh, and nausea or vomiting.*

6. These symptoms are the most characteristic of inflammations of the kidneys; yet they are not all present, unless in some of the more acute cases, or when the inflammation extends to the greater part of the tissues composing the organ; and they may be attended by various contingent and much less constant phenomena. In the slighter and more partial cases, particularly when the disease commences insidiously and proceeds slowly, any one, or more than one, of these symptoms may be absent; a disordered state of the urinary secretion and excretion being the most constant.

7. Until very recently, all the inflammatory and painful affections of the kidneys, whatever may have been the particular tissue affected, were comprised and confounded under the term nephritis. Late investigations have, however, shown that inflammations differ both as respects their *seats* in the particular tissues composing these organs, and as regards their *natures*, in relation to the states of the constitution, and the causes which produced them. I shall therefore describe: 1st, *The inflammations seated in the cortical or vascular, and in the tubular structures of the organ, with the modifications and complications and lesions usually presented by them;* 2d, *The inflammations seated in the calices and pelvis of the viscus, in connection with their modifications and complications; and*, 3d, *Inflammation of the investing structures of the organ.*

8. i. INFLAMMATION OF THE VASCULAR AND TUBULAR STRUCTURE OF THE KIDNEYS.— SYNON. — *Nephritis propria*, Author. — *Nephrite simple*, RAYER. — *Nephritis proper.*

9. *A.* CAUSES. — *a. The predisposing causes of* nephritis are, chiefly, hereditary conformation; the middle, advanced, and matured periods of life; the male sex, sanguine temperament, and plethoric habit of body; indulgence, long at a time, in soft warm beds; the use of much animal food, and of highly seasoned or spiced dishes, of too much food, and fermented liquors; addiction to venereal pleasures; riding much on horseback, or in a carriage; chronic disorders of the digestive organs; sedentary occupations, indolence and a neglect of due exercise; and the superabundance of excrementitious matters in the blood, more particularly of urea and its combinations. The calculous, gouty, rheumatic and scrofulous diatheses, and diseases of the bladder, prostate gland, and urethra, whether these depend upon hereditary descent or upon acquired disposition and advanced age, especially predispose to nephritis, and modify more or less the characters and course of the disease, the varieties and complications which result from their influence requiring a particular notice.

10. *b.* The *exciting* and *concurrent causes* of nephritis are injuries, blows, contusions, concussions, or wounds of the region, or in the vicinity of the kidneys, or of the spine; sudden jerks experienced on horseback, or in a carriage, or occasioned by missing a step on descending stairs; falls on the back or thigh; too long retention of the urine; the improper use of irritating diuretics, of emmenagogues, or of aphrodisiacs; too long a course, or too large doses, of the preparations of iodine, of nitre, &c.; indulgence in spirituous liquors; venereal or other excesses; the presence of calculi in the kidneys, or in the ureters; calculi in, or inflammations of, the urinary bladder; the sudden suppression of the perspiration, especially when inordinately increased; sleeping in the open air, or on the ground; sleeping in damp beds or sheets; cold and moisture applied to the loins, or lower extremities; cold and humid states of the air; currents of cold air striking against the loins; sitting with the back to a hot fire; the sudden interruption of accustomed discharges, as

the hæmorrhoids, catamenia, fluor albus, sudor pedum, &c.; the retropulsion and drying up of chronic eruptions, and old ulcers by external treatment; the sudden transfer of morbid action from the urinary bladder, genital and sexual organs, from the psoæ muscles, or from the organs of digestion and respiration, or interruptions to the healthy functions of those organs; retrocession or misplacement of gout, metastasis of rheumatism; paralytic affections, diseases and injuries of the spine or spinal column, and especially paraplegia; fevers characterised by a low state of the vital energies, and oppression of the nervous functions, with coma, &c.; the presence of animal poisons, purulent or sanious matters, or other hurtful excrementitial substances in the circulation, however, introduced there, whether by absorption, or from morbid changes in the chyle or blood, during the progress of other diseases.

11. From the above enumeration of the causes of nephritis, it will be manifest, that this disease, in some one or other of its forms, will appear — 1st. As a *primary* and *simple* affection, the result of causes influencing the vascular state of the kidney or kidneys, without any very manifest pre-existing lesion of this or any other organ, either in function or structure; — 2. As *consecutively* upon some other malady, affecting either this particular organ, or some other, or even the constitution generally; as upon the formation of calculi in the kidney itself, upon inflammation of the bladder or testis, upon gout, or upon disease of the prostate gland or urethra, or during the progress of fevers;—3. When appearing secondarily it may either form the chief or only lesion, or constitute one of a *complicated* state of disease; as when the nephritis is complicated with gout, rheumatism, or with other diseases of the urinary organs; — 4. Whether occurring *primarily* or *secondarily*, it presents various grades of activity, from the most *acute* to the most *chronic*, and gives rise to changes, which have some relation to the severity and duration of the attack; the circumstance of one or both kidneys being affected; the constitution and diathesis of the patient; the nature of the predisposing and exciting causes, and of the disorders which have preceded, or become associated with it, although such relation may not be obvious, nor admit of being traced with ease and certainty, numerous circumstances occurring and modifying the march and consequences of the disease.

12. *B.* DESCRIPTION.—The *symptoms* of nephritis vary extremely, according to the severity of the attack and the particular part of the organ inflamed; to the circumstance of one only, or of both kidneys being affected; and to the mode of attack. Inflammation seizes on either one or both organs, according to the predisposition of the patient and the nature of the exciting causes: but in either case, it may appear with great severity and suddenness, or in a mild, slight and insidious manner; or it may commence in this latter manner, and quickly pass into an acute and very severe form: on the other hand, a sudden and an acute attack may degenerate into a very obstinate and chronic form, notwithstanding the best efforts of the physician.

13. Not only may *inflammation of the vascular and tubular structures of the kidneys* assume any grade of intensity, and hence be *acute*, *sub-acute*, or *chronic*; but it may also be *modified in character* by the nature and combinations of its causes; by the diathesis, constitution, and age of the patient; and by the states of the circulating fluids. I shall therefore consider, *firstly*, its simple form, and as usually observed in a previously healthy constitution: and, *secondly*, the modifications arising from those circumstances.

14. *a.* The *symptoms of simple nephritis*—of *primary or idiopathic nephritis* — of inflammations of the vascular and tubular structure of the kidneys, which are independent of diathesis, of constitutional vice, or of animal poisons, vary with the severity of the attack, and with the age and irritability of the patient. — *α.* The *acute form* of the disease is generally attended, at its invasion, with chills, horripilations, or distinct rigors, and one or other of them occasionally, sometimes daily, appear during its course. A sense of heat, which augments rapidly, is at first felt in one or both lumbar regions. This soon is accompanied with pain, at first tensitive, afterwards lancinating and pulsating, in the same situation. The pain is at first not aggravated by pressure from behind, nor from before, unless it be applied firmly; but it is generally increased upon a full inspiration, and on coughing or sneezing, particularly when pressure is made upon the abdomen at the same time. The pain is also momentarily aggravated by efforts to pass a costive stool or to expel the urine, and at the time of turning suddenly around, or from side to side, and upon sitting down, especially upon a low seat. A very warm bed increases it, and a chill of the surface has generally a similar effect. The pain extends anteriorly through the abdomen; stretching in the course of the ureters and spermatic vessels and nerves, to the hypogastric region, often with extreme violence, to the testes, which are drawn closely to the abdominal ring, and descends to the extremity of the penis, which is small and retracted. Numbness is frequently felt in one or both thighs, according as one or both kidneys are affected; and this feeling is sometimes accompanied with painful lancinations in the thighs, descending often as low as the knee. The pain, posteriorly, ascends as high as the shoulder-blades; it is increased in the region of the kidneys, and is attended by an augmented sense of heat and pain after lying for some time on the affected side, when one kidney only is inflamed, or on the back when both are affected, although these positions give at first slight ease.

15. The *urine* is generally passed frequently and with aggravation of the pain. It is at first limpid and colourless, but is much diminished in quantity, becomes deeper in colour, and is voided more frequently and with more pain as the disease increases in severity. In the most acute cases, particularly when both kidneys are affected, the urine is in very small quantity, is voided with the most painful efforts, sometimes only in drops, is of a reddish, or sanguineous, or brown colour, or with small brownish flocculi; and it is often nearly, if not altogether, suppressed, so that the bladder is found empty upon the introduction of the catheter. The chief changes presented by the urine in simple nephritis are — 1st, it contains some blood or albumen; 2d, it is but slightly acid, or neutral, or alkaline; 3d, it sometimes contains a little purulent matter, or muco-puriform matter, particularly when the inflammation extends to the calices or pelves of the kidneys, or

when the disease is associated with inflammation of the mucous surface of the bladder, or of other parts of the urinary passages. Where nephritis is caused by cantharides, turpentine, or cold, the urine very commonly contains blood. In the simple form of nephritis, the presence of albumen in the urine is not constant, as is the case in the granular disease of the kidneys, or *albuminous nephritis*, as it is called by M. Rayer.

16. Soon after the accession of rigors, at the invasion of the disease, nausea and vomiting are often present. In the most acute states, retching continues throughout, although nothing may be rejected, and is renewed after taking fluids, so that the patient refuses every thing. He often complains, also, of severe colicky pains in the abdomen, which is sore upon firm pressure; particularly towards the lateral and epigastric regions. There is generally constipation, frequently with repeated desires to go to stool, and occasionally with tenesmus; all these symptoms depending upon intimate consent of parts. The *pulse* is hard and frequent, and full during the remissions of pain; but in the paroxysms or accessions of pain, it is smaller and contracted. The *skin* is at first hot, dry, or burning; but, as the disease advances, it becomes more moist, is partially and irregularly covered by a disagreeable perspiration, and, in cases characterised by a partial or total suppression of urine, the perspiration has an urinous odour.

17. When the *disease extends to the investing membrane* of the kidneys, the symptoms are then very acute, the pain severe, the pulse hard and contracted, and the urine is less changed from the natural state, relatively to the severity of the pain and constitutional symptoms, then when the secreting structure is chiefly affected. But the disease is more rarely limited to one or other structure, although either may be its principal seat. When it commences in the secreting and more internal textures, or in the calices or pelvis of the organ, the urine contains much mucous or muco-puriform matter, and is very scanty; and the pulse is softer, the symptoms are milder, and the *course of the disease* slower than that above described, *which is seldom prolonged* beyond a fortnight, frequently not beyond six or seven days, without giving rise to some one of the changes or lesions which will be noticed in the sequel. When the attack is occasioned by the irritation of calculi in the kidney, there are commonly more numbness of the thigh and painful retractions of the testes, and severer pains, shooting at intervals to the hypogastrium or in the course of the ureters, than in the more primary and simple states of the disease, which states are of less frequent occurrence than this, and of shorter duration; this particular cause, and the complication produced by it being generally a chronic disease, liable, however, to assume an acute or subacute form, as will be noticed hereafter.

18. *Acute* and *sub-acute nephritis* most commonly implicates one kidney, both organs being more rarely affected, especially in the same degree, at the same time. Whilst total suppression of urine may be considered as distinctive of severe disease of both kidneys, yet both may be inflamed, and a scanty secretion take place, for a portion of either organ may be still enabled to perform its functions. These states of nephritis commonly present themselves as follow: — 1st. *Mild acute or sub-acute:* — the pain in the loins slight; little diminution or change of the urine; slight symptomatic fever, and speedy subsidence of the disease under treatment. 2d. *Simple acute and sthenic nephritis:* — greater severity of the pain and of the other symptoms; inflammatory fever, preceded by rigors; marked diminution of the urine, with the morbid appearances and disorder attending the discharge of it, described above (§ 15.). 3d. *Acute nephritis, with ischuria, and disturbance of the cerebral functions:* — suppression of urine altogether or nearly complete; vomitings or retchings from the commencement; pain in the loins, in some cases severe, in others obscure; lethargy, sopor, or coma, supervening in the worst attacks. 4th. *Asthenic or malignant acute nephritis:* — inflammation of the structure of the kidneys occurring during states of cachexia, or coincident with morbid states of the blood and depression of vital power, or appearing in the course of low fever or scarlatina, attended by a lurid, dusky, and offensive odour of the surface of the body; little or no pain in the back or loins, unless firm pressure be made; the supine posture, in a state of stupor, or sopor, the patient answering questions with difficulty and imperfectly; suppressed, scanty, or involuntary excretion of urine; frequent occurrence of slight rigors; the tongue dry, loaded, and brown; little or no thrist; stupor, coma, and an offensive odour proceeding from the surface.

19. *β. Sub-acute nephritis.* When inflammation of the secreting structure of the kidney takes place *slowly*, in a mild and sub-acute form, the patient complains of dull or shooting pains in the lumbar region, occurring at longer or shorter intervals, with disorder of the secretion and excretion of urine, aggravated by errors of diet and regimen. These symptoms are connected with more or less disturbance of the system generally, and of the functions of the digestive organs; frequently presenting periods of aggravation and amelioration, and occasionally assuming suddenly, especially after the operation of one or more of the causes above enumerated (§ 10.), a very acute form.

20. This state of the disease is of very uncertain *duration*. Sometimes it continues, with intermissions, for several weeks or even months, when it may assume a very *acute* or *hyper-acute form*, or may subside into a less severe and more *chronic state*.

21. When *sub-acute* nephritis passes into a *hyper-acute* state, the disease may reach its utmost severity in two or three days, and if circumstances favour its continuance, or insufficient means be adopted to subdue it, the symptoms assume, in one, two, three, or four days more, the most dangerous character. The pain becomes sometimes insupportable; the pulse small, contracted, unequal, or intermittent, frequently slow; the extremities become cold, or are kept warm with difficulty; the countenance assumes a leaden or murky hue, and the features are otherwise much changed; hiccup supervenes, and a cold, fœtid, or urinous perspiration covers the surface of the body. The urine, if any be voided, is usually now very dark-coloured, filamentous, passed drop by drop, and of a cadaverous odour. The muscular force sinks rapidly; fainting delirium, con-

vulsions, stupor, and coma supervene, and the patient dies.

22. *γ. Chronic Nephritis.* — Inflammation of the substance of the kidney may exist in either the *acute* or *sub-acute* form, and gradually lapse into the *chronic state*. Or, inflammatory action may commence in a slight and mild form, proceed gradually and insidiously, and be so obscure as not to awaken the fears of the patient, and as to escape the observation or detection of the physician. In these cases, pain, if at all present, is often slight or obscure; disorder of the quantity and states of the urine; a diminution of acidity, and a neutral or alkaline state of it; disorder connected with the evacuation of it, a feeling of weakness, or of slight numbness in one or both lower extremities, are the symptoms most commonly observed. The urine is generally turbid, occasionally only albuminous, generally abounding with the phosphatic salts and with mucus, and often depositing sediments, or containing more or less of gravelly matters. It is always voided frequently, but in very small quantity at a time. Pain in the loins is often not felt unless on firm pressure, and on taking a full inspiration. It sometimes extends in the course of the ureters; but seldom to the testes. When it is not associated with disease of the bladder or prostate, there generally is little or no fever, unless at night, or when the patient is heated by a warm bed. This state of nephritis is often excited, or perpetuated by disease of the urethra, or prostate gland, or urinary bladder. In some cases this form of the disease approaches a succession of slight attacks of acute or subacute inflammation, each subsiding for a time or returning, or affecting circumscribed portions of the organ. When both kidneys are affected, the chief symptom may be the gradual deterioration of the constitution, and development of cachexia, favouring the occurrence of other maladies, especially dropsy.

23. Many of the organic lesions found in the kidneys upon dissection, as well as the formation of calculi in the organ, proceed from this slight and slow state of inflammatory action of its secreting structure; and, whether passing into more active forms of disease, or giving rise to suppuration, it frequently renders the future life of the patient irksome, especially when affecting old persons, even without producing the latter effect; but when it occasions this, the patient, particularly if he be advanced in life, but rarely escapes. The chronic, as well as the acute, forms of inflammation generally attack one kidney only, and more rarely both at the same time, or in the same degree: hence the urine is very rarely suppressed, although it is often much diminished in quantity. RICHTER (*Therapeia Specialis*, t. i. p. 534.) says that the left kidney is more frequently inflamed than the right; and a similar opinion has been stated by other pathologists; but this is not satisfactorily proved.

24. *δ. Nephritis in the female* is a less frequent and less dangerous disease than in the male, but it is often more difficult of detection in its chronic forms especially; and it is liable to be mistaken for affections of the uterine organs, with which also it is occasionally complicated. The existence of pain in the lumbar region extending to the abdomen, and shooting towards the bladder and groin with numbness of the thigh and disorder of the secretion and excretion of the urine, are, however, sufficient to prove the existence of nephritis in this class of patients. Two cases of the disease in females have come before me which had been mistaken for disease of the colon, and one for inflammation of the bowels. This want of knowledge of so very important a disease has evidently arisen from the very slight attention paid to diseases of the kidneys by systematic writers, and to the careless way in which the urinary secretion is examined by too many practitioners. Nephritis is not infrequent among females recently confined, but is then commonly associated with inflammation of the veins of the uterus and ovaria, or with peritonitis.

25. C. TERMINATIONS, &c. — *a*. When resolution takes place, the severe symptoms abate from about the fourth to the ninth day in the more *acute* cases; and, in the *sub-acute state*, frequently not until the twelfth or fifteenth of the attack. When this change occurs the urine becomes more abundant, paler, is voided with less uneasiness, and deposits a sediment: the pulse becomes more natural; occasionally fuller, softer, and even quicker than previously, especially if it have been slower during the acute state; a general perspiration breaks out, and critical discharges, particularly the hæmorrhoidal and catamenial, sometimes appear, especially when the disease has arisen from suppression of these evacuations. In some cases, particularly in persons advancing in age, resolution is imperfect, the urine continuing scanty and albuminous, other symptoms remaining in a slight form. In these there is reason to suspect that slight depositions of coagulable lymph have taken place, during the acute state of the disease, in the tissues composing the body of the organ, and are giving rise to granular degeneration.

26. *b. Suppuration* or *abscess* does not so often occur during inflammation of the vascular and tubular structure of the kidney, than is supposed. The presence of purulent or muco-puriform matter in the urine is no proof of suppuration of these parts, but merely shows that the inflammation has extended to the *calices* and *pelvis* of the organ. — *Abscess* of the kidney may be the consequence of inflammation either unconnected with, or depending upon, calculi in the tubular structure. It may also proceed from slight or *chronic* or *sub-acute* inflammation in scrofulous subjects, and more commonly it is in them unconnected with calculi, and assumes a more chronic character. — If the very *acute* form of nephritis continue, without material alleviation, beyond seven or eight days, or the sub-acute persist longer than fifteen days, the formation of matter may be dreaded, especially if, about this time, several of the following symptoms appear: when the disease passes from an acute into a more chronic state, or milder character, the pain and heat being abated, but still continuing; when the pain becomes dull and pulsating, with a sense of weight or embarrassment in the lumbar region, and increased numbness of the thigh corresponding with the organ affected; when rigors occur irregularly or at different hours of the day; and when perspirations become frequent and copious, the pulse small, weak, and soft, the symptomatic fever assuming an adynamic, and subsequently a typhoid character, cerebral symptoms supervening, we may then conclude that an abscess has formed in the structure of the kidney.

27. In the more *chronic* or *sub-acute* cases terminating in abscess, an œdematous fulness or swelling, without change of colour, is sometimes observed. In several instances, firm pressure of the lumbar region occasions acute pain, extending to the groin; and the urine contains either blood or gravelly matter, or a whitish purulent matter more or less intimately mixed with it, and rendering it thick and turbid. In these more chronic states, the constitutional symptoms are nearly those of hectic fever. The symptoms may truly indicate the existence of abscess, and yet no pus be seen in the urine, which may even remain clear. But, after a considerable time, the matter finds its way into the pelvis of the kidney, and a large quantity of pus, with some blood, is evacuated with the urine, often occasioning, by its acrimony, much irritation of the bladder and urethra. In other cases little or no pus is evacuated in the urine, owing to the passage along the ureter being obstructed, either at the pelvis of the kidney, or in some part of the ureter, by a large calculus, which most probably had induced the inflammatory action giving rise to abscess, and which now prevents the passage not only of the matter, but also of the urine to the bladder. In some of these cases, the abscess points externally in the back or loins, or even in the side or above the groin, the patient either sinking under the affection, or partially or altogether recovering. The abscess may burst internally into the peritoneal cavity, and it then proves quickly fatal; or it may open into the colon, and the patient either recover or sink. Of these occurrences, numerous instances are recorded in the works contained in the *Bibliography* to this article.

28. In the greater number of cases of abscess, "the ureter remains more or less pervious, and the patient continues at intervals to discharge pus, and sometimes small calculi, blood, &c., with the urine for a long time" (PROUT). — When the abscess opens externally, the aperture continues for a considerable time to evacuate purulent matter of an urinous odour, or pus mixed with urine, and sometimes urine only. When the abscess discharges pus merely without any urinous odour, or without any intermixture of urine at any period of the discharge, it is then very doubtful whether the abscess is connected with the kidney or no. It may proceed from caries of one of the vertebræ, from which it is necessary to distinguish the abscess now under consideration.

29. When the *fistulous opening*, leading from an abscess of the kidney, becomes obstructed either by granulations or by a calculus, the discharge ceases, and a pulsatory pain generally returns in the lumbar region, followed by increased heat of skin, accelerated pulse, or even delirium, which continue or increase until the obstruction gives way before the accumulated matter. When at last the external opening heals up, without the immediate return of the previous dangerous symptoms, a relapse may take place at a more remote period, owing to the return of the inflammation, probably again induced by a calculus formed in the kidney. In the majority of cases, especially in the earlier stages, of abscess, one kidney is only affected; but this may be altogether destroyed by it. In protracted cases, particularly in aged persons, the other kidney generally participates in the disease, to a greater or less extent, before the one first attacked is altogether disorganised. Although suppuration is a consequence of inflammation, whether unconnected or complicated with calculi in the kidney, yet the origin of the calculi is a matter of importance. It is very probable that they may be a result of slow inflammatory action of the tubular structure, and that, when they are formed, they heighten this action, and give rise to suppuration. (See URINE, &c.)

30. When the *chronic states* of nephritis occurs in scrofulous persons, abscess often results, even independently of calculi, with which, however, the abscess may be associated. When abscess takes place in the strumous diathesis, the symptoms attending its formation and maturation are much more obscure than in other constitutions, and the disorganisation of the kidney generally is more complete. In the latter stages of the disease, and in the more chronic cases, Mr. HOWSHIP has remarked that the patient refers his complaints more to the neck of the bladder than to the region of the kidney; but in recent cases this is not so generally observed. Dr. PROUT has met with instances, where the pain referred to the lumbar region, as in ordinary cases, and the urine was acid, and, abstracting the pus, not very unnatural. I agree with Dr. PROUT in imputing the sufferings in the bladder, in the more chronic cases of this form of abscess, to the exceedingly fœtid, acrid, and unnatural state of the urine, which is usually alkaline, and evidently of so irritating a nature as probably not to be retained in a healthy bladder for a moment, without producing great pain. Mr. HOWSHIP, however, mentions instances of this form of the disease, where the urine appeared natural, and yet the pain was referred to the bladder nevertheless. But there was very probably, in these cases, disease of the prostate gland, or inflammation of the parts in its vicinity, or of those adjoining the openings of the ureters, complicated with the disease of the kidney; for I have observed such complications in cases which occurred in my practice, where the symptoms were chiefly referred to the bladder, and yet the urine seemed nearly natural. Dr. PROUT remarks, that the cases of this scrofulous affection of the kidneys that he has seen, have also been attended with indolent tumour and abscess of the inguinal glands, and by occasional pain and swelling in the testicles. They were accompanied by great extenuation of the body, and derangement of the general health; and in all instances ultimately proved fatal. (*On Diseases of the Urinary Organs*, p. 216.)

31. *c.* The termination of nephritis in *gangrene* is very rare; the change actually taking place and often mistaken for gangrene, as sometimes approaching this state, is *softening*, more or less marked, of portions of the inflamed tissues, with purulent infiltration, in a greater or less number of points. If gangrene take place, it is indicated by the symptoms usually attending it in other organs, especially by sudden sinking of the vital powers, and cessation of pain; singultus, vomitings, anxiety, restlessness, coldness of the surface and extremities; small, thready, and weak pulse; wanderings of the intellects, and delirium. The urine also becomes altogether suppressed, or remarkably scanty and fœtid.

32. *d.* Some degree of either *induration* or *soften-*

ing may follow acute nephritis, particularly the former; and the patient may either apparently recover, or the disease may assume a chronic form. Some degree of induration of the substance of the organ consequent on the acute state of the disease, may not be inconsistent with the discharge, to some extent, of its functions; and when one organ only is affected, the urine may not be materially altered, or even not at all diminished. In these cases, the quantity secreted by the indurated organ cannot be ascertained, as the function of the healthy kidney is increased. The albuminous state of the urine in these cases seems to indicate that the indurated kidney still performs some part of its functions.

33. *D.* CHANGES OBSERVED AFTER DEATH *from inflammation of the vascular and tubular structure of the kidney.* *a.* At an early stage of the *acute* form of the disease, the *volume* of a part or of the whole of the organ, according as the affection is general or partial, is more or less increased. In a few cases the kidney may be increased to twice, or even thrice, its natural bulk. At this period, and before the parts inflamed become infiltrated with pus, they present a morbidly *red tint*, generally a deep or *dark red*, and sometimes a brownish ecchymosed appearance. The vessels of the cortical structure and the more superficial veins are enlarged and more than usually distinct. Besides these, M. RAYER remarks that a number of small points of a lively red, not elevated above the surface, may be seen with the unassisted eye in the exterior of the organ. These small red points are also found in the first stage of granular disease or inflammation of the kidney — of the *nephrite albumineuse*, of this writer,—and are often intermingled with black points and with small vesicles. These latter points are often surrounded by a very delicate network of vessels. On division, the vascular or cortical tissue of the inflamed kidney presents a similar congeries of red points, distinct from the orifices of divided vessels; these points are disposed in lines or series, very rarely in groups, and are the glandules of MALPIGHI—the *corpora Malpighiana*—highly injected. Sometimes these glandules, especially at the exterior of the organ, assume the appearance of dark or black spots, either isolated and distinct, or approaching each other in a series or in groups. The surface of the organ, also, presents an irregularly red tint, with scattered spots of a livelier red than that of the surrounding tissue. The substance inflamed is, moreover, dotted with true ecchymoses, disposed either in lines, or in bands, which probably become the bases of the purulent infiltrations observed at a further advanced stage.

34. When the acutely inflamed kidney is augmented in volume and weight, it often also presents a *red induration* of the vascular and tubular tissues. This induration and redness are commonly general as respects both these tissues; and the glandules of MALPIGHI are also highly injected and very apparent. Upon pressing the divided parts of an indurated, reddish brown kidney between the fingers, a larger quantity of blood escapes than in the healthy state; but not with that facility observed in the passive congestions of the organ consequent upon intercepted circulation through the right side of the heart.

35. In some states of simple acute nephritis, M. RAYER has observed portions of the organ in a state of anæmia interspersed between other parts which are morbidly red, and ecchymosed, or infiltrated with pus. This association of anæmia of some portions of the kidney with inflammatory injection &c. of other portions, is also often found in cases of chronic nephritis which have passed into the acute form previously to death.

36. Purulent infiltration is more frequently remarked in the vascular than in the tubular tissue of the organ; the former portion being more commonly and severely inflamed than the other. The infiltrated pus appears in the form of grains of white sand, or of minute depôts of the size of pins' heads, surrounded by a brownish red tissue. In some cases, the purulent formations are much larger, although less numerous, being of the size of pustules, or of small peas, and, in rare instances, as large as nuts. It is comparatively rare to find abscesses, or purulent collections in the substance of the kidney larger than these, most of the cases of large abscess in this organ, being purulent collections of the calices and pelvis consequent upon inflammation of these parts, and obstruction of the ureter. These collections are surrounded by a deeper redness than that of the adjoining parts, even when the whole of the organ is inflamed. The small abscesses, seen at the surface of the kidney, penetrate more or less deeply into its substance, and often infiltrate the tissue immediately around them, so that drops of pus may be squeezed from it, by the point of the scalpel. Some parts of the organ are *softened* and *infiltrated* with pus, and are of a yellowish white colour, drops of pus being squeezed from them when divided; these have not yet proceeded to the state just described, or are merely in the course of passing into that of small abscesses; they are met with in the vascular as well as in the tubular structure. *Gangrenous softening* is very rarely observed in these structures, and is characterised by its brownish hue, by their tomentose aspect when they are plunged in water, and by the odour exhaled by them.

37. *b.* The *chronic forms* of nephritis present various changes, some of which are very opposite in their natures. When the whole of the organ has been chronically inflamed, *atrophy* of it is much more frequently observed than *hypertrophy*, which also occurs. In some instances the vascular tissue of the organ presents a species of hypertrophy occasioned by a deposition on it of lymph, which has assumed subsequently a fribro-cellular character. In others, patches of a yellowish colour are seen exteriorly, and are found to consist of a somewhat similar substance, manifestly produced from coagulable lymph long previously thrown out. After the chronic states of inflammation, the substance of the organ is more or less indurated, denser and specifically heavier than natural. The external surface is often granulated, or rugous, or it presents a variously coloured, or marbled appearance. Deep redness is seldom observed, unless an acute state of inflammation has supervened on the chronic shortly before death, and then it is seen both on the surface, and more or less through the substance of the organ. An anæmic condition, either partial or general, and commonly associated with induration or increased density of the textures, is one of the most frequent lesions produced by chronic simple nephritis: and is generally further associated with a granu-

lated and marbled state of the surface, and with atrophy. This anæmic state commences in the vascular tissue, and extends to the tubular texture, both of which may become ultimately pale, indurated, and atrophied in a very remarkable manner. When atrophy takes place in several distinct points or parts of the organ, the external surface often presents an unequal, rugous, or mammalated appearance. The *papillæ* of the cones or tubular structure undergo various changes consequent upon their induration. Sometimes the *cones* are very acute, and of a whitish yellow colour. The papillæ are occasionally eroded or infiltrated with pus, more rarely they are ulcerated.

38. *c.* The *membranes external* to the organ often participate in the inflammation of the more internal textures, and present the usual consequences of this participation, especially vascular injection, exudation of coagulable lymph, and, in the chronic cases, thickening of the membranes and increased adhesions of them over the parts inflamed. In some cases they also experience various changes of colour, chiefly of a brownish or blackish hue; and occasionally they are changed, in places, to fibrous, fibro-cartilaginous, or even to a cartilaginous or osseous state. Besides these lesions, others hereafter to be described take place as a consequence of inflammation; and various inflammatory changes are also observed in the calices and pelvis of the organ. The veins of the kidneys are sometimes inflamed, but independently of this form of nephritis. Renal phlebitis is more frequently associated with granular degeneration of the kidneys or albuminous nephritis.

39. *E.* DIAGNOSIS OF THE SIMPLE STATES OF NEPHRITIS.— *a.* The distinctions between these and the other forms of nephritis will be made more manifest when the latter come under consideration. I shall, therefore, merely remark very briefly that, in the gouty variety of nephritis, the urine deposits crystals of uric acid, which are never observed in the simple form of the disease; and that the granular degeneration of the kidney is always either accompanied with or followed by dropsy, and characterised by a constant and marked albuminous state of the urine, this latter change being only accidental and evanescent, although sometimes recurring, in the simple forms of nephritis. The inflammation of the substance of the kidneys, occurring in the course of low and exanthematous fevers, arises from the morbid poison in the blood, or rather from the accumulation of excremential matters, and the consequent alterations, in this fluid, in connection with the state of organic nervous power; and, from being thus a consecutive disease, and attended by certain features hereafter to be noticed, cannot be confounded with the primary and simple nephritis just described.

40. *b.* It is often impossible to distinguish the acute form of simple nephritis from *inflammation of the investing membranes* of the kidneys on the one hand, or from *inflammation of the pelves and calices* of these organs, on the other; because the disease is seldom limited altogether to either of these structures, although it be seated in one or other chiefly. When the urine contains much mucus, or a muco-puriform matter, the urethra and urinary bladder being sound, then the morbid secretion can proceed only from the pelves and ureters. But, in these cases, it is almost impossible to say that the bladder is healthy. However, when inflammation of the pelves and calices is so severe as to produce an abundant secretion of mucus, it is very rare that the substance of the kidney does not participate in the inflammation. When, in addition to this secretion, there is severe pain felt in the loins, attended by vomiting and other acute symptoms, it may be inferred that the disease extends to both the substance and the pelvis of the organ. It is much more difficult to distinguish the *chronic states of inflammation of the substance*, from *those of the pelvis*, of the kidney, even although the morbid action be confined to either structure; but such limitation often does not exist, both parts being implicated, although one or other is more especially affected. Still, in the simple chronic nephritis, the quantity of muco-puriform matter in the urine is much less than when the calices and pelves are chronically inflamed, and the phosphates are more frequently found in suspension. Most of the cases usually denominated abscess of the kidney are nothing more than accumulations of pus in the pelvis, owing to the obstruction caused by a calculus distending it and the surrounding parts, and transforming the organ into a large multilocular tumour, containing puriform matter. When the inflammation is seated chiefly in the calices and pelvis of the organ, and especially when it is caused and perpetuated by calculi, then more irritation is felt in the bladder, especially about its neck, and more pain in the course of the urethra, than in other cases. The irritability of the bladder is sometimes so great, in these cases, as to almost amount to incontinence of urine.

41. *c. Inflammation of the* surrounding *cellular tissue*, or of the *investing membranes* of the kidneys, very closely resemble acute nephritis; but there is not such remarkable changes in the quantity and character of the urine, or such disorder connected with the excretion of it, correspondent with the acuteness of the local and constitutional symptoms, as are observed in true nephritis. When the *membranes* especially are inflamed, the sense of heat and the pain are very great, whilst the diminution of urine, and the difficulty of excreting, are not so remarkable. When the *surrounding cellular tissue* suppurates, and a considerable abscess is formed, the lumbar region becomes full and distinctly œdematous, and ultimately even fluctuation may be detected. Inflammation of the *cellular tissue surrounding the psoas muscle* — *psoitis*, or the commencement of *lumbar abscess* — may be mistaken for nephritis; but in the former disease the pain is much increased upon flexure of the thigh upon the trunk, whilst the secretion and evacuation of urine are either not disordered or but slightly disturbed.

42. *d.* Nephritis is distinguished from the simple irritation consequent upon the *passage of a calculus along the ureter*, chiefly by the fever which accompanies the pain of nephritis from its commencement, and by the pain never being altogether absent, although it is generally characterised by remissions and exacerbations. Nephritis can hardly be confounded with *nephralgia:* this latter affection is very rare; the pains constituting it are much more violent than those of nephritis, are sudden in their accession and disappearance, and are unattended by fever or heat of skin.

43. *e.* From *acute rheumatism* nephritis will be readily distinguished by the nausea, vomiting, colicky pains in the abdomen, the numbness of the thigh, the extension of the pain to the hypogastrium and groins, and to the testes, with retraction of them to the abdominal ring, and the disorder of the secretion and excretion of urine which characterise the latter disease, but which do not attend the former, unless rheumatism attacks or extends to the investing membranes of the kidneys, as will be more particularly noticed hereafter. *Lumbago* can hardly be mistaken for nephritis, as, besides the absence of the above symptoms in the former disease, it is seldom attended by any febrile action; and the pain on bending the back, upon rising from a seat, or exerting the dorsal muscles is distinctive of the rheumatic nature of the affection.

44. *f.* In *females*, nephritis is often distinguished with difficulty from *colic*, from inflammation of the psoæ muscles, from enteritis, from obstruction and inflammation of the colon, and from inflammation of the internal iliac vein or artery. Numbness of the thigh, pain in the lumbar region, extending in the course of the uretus to the groins, insides of the thighs, and urinary bladder, and being referred more to the posterior regions of the abdomen than to its anterior aspect, with absence of tenderness upon slight pressure, and the disorder of the secretion and excretion of urine, are generally sufficient to mark the nature of the disease.

45. *g.* It is often more difficult to distinguish nephritis from *uro-cystitis*, than is generally supposed. It should, however, be recollected, that both diseases are often associated; and that both simple nephritis and inflammation of the pelvis of the organ, caused by the irritation of a calculus, may be attended by more severe symptoms referred to the bladder and urethra than those felt in the lumbar region; whilst uro-cystitis may be attended by pain in the loins, and various other symptoms of nephritis. The great irritability of the bladder, the appearance of the urine, the pain behind the pubis, and the absence of numbness of the thigh or of pain and retraction of the testes, unless when the kidneys are also affected, will generally indicate the seat of the disease. But this subject will be noticed more particularly hereafter.

46. ii. MODIFIED STATES OF NEPHRITIS.— Inflammation of the kidneys presents various modifications or varieties proceeding from the diathesis of the patient, and the nature of the exciting causes.

47. A. *Of Gouty Nephritis — of Nephritis in the Gouty Diathesis.* The fact of gout attacking the kidneys was first remarked by ARETÆUS, and more particularly by WEPFER, SPECHT, SYDENHAM, BONET, F. HOFFMANN, MORGAGNI, DE HAEN, STOLL, VAN SWIETEN, CHOPART, and by other practical writers of the last century. Modern authors, especially BARTHEZ, HOME, GUILBERT, PROUT, SCUDAMORE, BRODIE, RAYER and others, have further shown that inflammations of the kidneys, either with or without gravelly and calculous formations, but most frequently in connection with them, are very liable to occur in gouty constitutions, or in connection with gouty attacks, and to assume peculiar features.

48. *a. Symptoms.* — These vary remarkably according as the inflammation is associated with uric acid gravel in the vascular and tubular structure, or with calculi in the pelvis or other parts of the organ, or with disease of the bladder or prostate gland. Gravel or some calculi may exist long in the substance of the kidney, without any of the symptoms of disease of the organ being felt, or at least felt so as to attract particular notice. It is only when these produce irritation, or when various circumstances occasion vascular determination or congestion of the kidneys, or when a calculus is arrested in the ureters, that indications of disorder in this quarter present themselves. In these cases, the disease assumes features more particularly noticed in the article URINE, and gives rise to those painful affections usually called *nephritic colic.* When these painful attacks occur in a gouty person, and are accompanied by a frequent desire, especially during the night, to pass the urine, this fluid containing more or less albumen, and blood-globules, with acid, they probably depend upon calculi in the pelvis of the kidney, or in the ureter; and this will be still more probably the case, if the pain exist in, or extend to the lumbar region, and is attended by great irritability of the bladder, by incontinence of the urine, by pain about the neck of the bladder and in the urethra, and by uneasiness, numbness, &c. in the thigh, testes, &c. Whenever the urine of a gouty person presents crystals of uric acid, sometimes with a little blood, or mucus, or muco-puriform matter, then the existence of calculi or gravel in the kidney may be suspected, although the symptoms referable to this organ itself may not be very severe or well marked. When these morbid states of the urine are more decidedly characterised, the existence of calculi may be inferred with much certainty, and is often proved by their escape with the urine at no very distant period. When calculi do not exist in the kidneys, pains in the lumbar region are not constant, or are merely passing. The circumstances, however, which more especially distinguish gouty nephritis, are the occurrence of the inflammation in the gouty habit, and in connection with gravel and calculi; the very acid state of the urine, which immediately presents or deposits crystals of uric acid, and the antecedent and attendant symptoms of gout in the system. On the other hand, in *simple nephritis,* the urine is most frequently neutral or alkaline, deposits an amorphous sediment, usually composed of the phosphate of lime, or of the urates, or of the ammoniaco-magnesian phosphate. In proportion to the acuteness of the attack, to the diminution and other changes of the urine, and to the predominance of the symptoms more strictly referable to the kidneys and bladder, is the constitutional or febrile disturbance usually great. When the urine is suppressed or nearly so, bloody, remarkably scanty, or very dark-coloured, and the pains in the loins, &c. and the attendant fever severe, either inflammation, or extremely active congestion of the vascular and tubular structure, or obstruction of the pelvis at the commencement of the ureters of both kidneys, has taken place. When this attack occurs somewhat suddenly, or upon the premature disappearance of gout from the lower extremities, or after the usual premonitory indications of gout, if it appear either as suppressed, or metastatic, or misplaced gout; then acute inflammation, or very active congestion, of the substance of the kidneys, may be inferred to

exist. I lately treated a case of gouty nephritis, in which the urine was of a black, inky tint, and remarkably scanty; this colour having arisen from the action of the acid in the urine upon the blood exhaled from the inflamed organ.

49. *b. On dissection of fatal cases of gouty nephritis*, numerous particles of crystallised uric acid may be detected at the surface, or in the substance, of the vascular structure of the kidney. This substance is generally more or less inflamed in parts, and altered in structure, as already described when stating the lesions produced by simple chronic nephritis (§ 36.). Gravel or small calculi are also found in the papillary structures, in the calices, and in the pelvis of the organ; those in the latter situations being commonly larger than those found in the tubuli. The investing membranes of the kidney are rarely materially altered.

50. *B. Of rheumatic nephritis.* — *a.* The occurrence of nephritis in connection with rheumatism in different parts of the body, has been noticed by several writers; and, in very recent times, also in connection with rheumatic pericarditis and endocarditis, or antecedently or subsequently to these diseases. I have seen nephritis supervene upon rheumatism of the lower extremities, and upon rheumatism of the testes after sleeping in a damp bed; and I have observed in a female, rheumatism of the limbs, of the ovaria, and of the kidneys, nearly contemporaneous, owing to the same cause, the affection, however, of the former parts subsiding as that of the latter became more prominently developed. This variety of nephritis is generally very obscure. Pains in one or both loins, in the limb of the same side, and in the testes, are very equivocal symptoms, particularly in a rheumatic subject, as they may be either simply rheumatic, or symptomatic of inflammation of the kidneys; but when they are attended by ischuria, or by a very marked diminution of the urine, whilst there is not a very copious perspiration, and by an albuminous and acid state of the urine, which is voided frequently, and in small quantity, with increase of pain, and which is either very deep-coloured or deposits a rose-coloured sediment, it becomes probable that the kidneys are actively congested or inflamed.

51. *b.* It is not infrequent to find extensive *organic changes* in the kidneys of persons who have died of diseases of the heart, consequent upon rheumatism; and who have recently, or at no very remote period, complained of disorder of the urinary functions or organs. These lesions have consisted chiefly of the infiltration of coagulable lymph, at several points of the vascular structure of the kidneys. These nearly solid deposits have given rise to marked unequal prominences on the external surface of the organ, where they appear as yellowish patches. These deposits of lymph are of various sizes; sometimes sinking deeply into the vascular structure, and approaching nearly the size of a nut or bean. Their limits are distinctly marked by a dark reddish tint of the surrounding tissue. The membranes external to the kidneys, particularly the portions of them corresponding with the deposits of lymph, are generally injected; the calices and pelves are also inflamed, presenting numerous vascular arborisations and red points. Small collections of pus are sometimes observed in the vascular and tubular structures; and the organ is generally increased in weight and volume, and occasionally, also, more or less indurated. In the more *chronic cases* of this variety of nephritis, or when the nephritic disorder has preceded dissolution a considerable time, eminences and irregularities of the external surface of the organ are observed: and what had manifestly been, in the acute stage, deposits of coagulable lymph, are now changed into a firm yellowish substance, of the consistence of condensed cellular tissue. In the pits or depressions on the external surface, the fibrous and cellular membranes of the kidneys are so firmly united with each other, and with the subjacent cortical substance, as not to be separated unless with the greatest difficulty. These membranes are sometimes thickened throughout, but much more frequently only in patches or partially; where they are also much more opaque. Simple serous cysts are occasionally found in the vascular, and cartilaginous bodies in the tubular, structure.

52. *C. Consecutive nephritis — symptomatic or secondary nephritis — asthenic nephritis.* — Inflammation principally of the vascular and tubular structures of the kidneys often arise in the course of febrile and exanthematous maladies, especially those which assume an adynamic or malignant form, or in which the blood becomes more or less contaminated. In many of these cases, it is a state of *active congestion* of the organ rather than that of *inflammatory action*, which takes place; or if it be the latter, it is inflammation of the *asthenic kind* described in the article INFLAMMATION (§ 54. *et seq.*); and is produced by the morbid state of the blood, or by the superabundance in it of those injurious elements or materials which require elimination from it, and which are usually excreted by the kidneys. M. RAYER has described these consecutive diseases of the kidneys under the head of nephritis from *morbid poisons*: but the affection of these organs is merely an accident or contingency occasionally occurring in the course of certain contaminating maladies, or rarely only in the course of others, and as frequently takes place during paraplegic diseases or after injuries of the spine, as during the progress of those maladies.

53. *a.* During the continuance of *adynamic or typhoid fevers*, and particularly when the nervous manifestations are prostrated or depressed, and where the blood becomes altered either by the accumulation in it of excrementitious matters, or from the insufficient supply of salutary elements, congestion, or asthenic inflammation, not infrequently occurs in the kidneys. In these circumstances *both organs* are generally affected. The pain in the loins commonly complained of during fevers, and attributed to other causes than to inflammation, or to congestion of the kidneys, often misleads the physician, and, when really proceeding from the vascular condition of these organs, is not generally ascribed to it. In other cases the sensibility is so much impaired before this affection supervenes, that the state of the urine itself and the phenomena attending its evacuation, are the chief indications of its existence. In these especially, the *suppression* of the urine may be the first indication of it; and then it may be difficult to determine whether or not the suppression be the *cause* or the *consequence* of the inflammation;

for it may be either. The circumstance of its so being recognised by the physician, will generally enable him to infer correctly the alternative; — if the suppression of urine has been preceded or attended by sopor or coma, or by the supine posture and partial loss of sensibility, the inflammation of the kidneys probably has been consequent upon, or aggravated by it; the suppression being the consequence of *congestion*, which may pass into asthenic inflammation: but if this state of the urinary function has preceded sopor or insensibility, or is independent of this state of the nervous manifestations, then is it the consequence of inflammation of the kidneys, and not the cause. It is extremely rare, however, for the suppression or the nonsecretion of urine to precede those states of disease; more generally the urine is secreted, its *retention* or *accumulation* in its existing morbid condition being the cause of the affection of the kidneys. In all cases of fever, when the urine is retained in the bladder, for some time, or when this viscus becomes distended by it, the supervention of nephritis should be suspected. Whenever, in the course of low fevers, the urine is remarkably scanty or of a dark brown colour; when it ceases or nearly ceases to be acid, or becomes alkaline; when it contains mucus, or blood-globules, or albumen; and when the patient complains of pain or difficulty in voiding it, or of pain or of tenderness on firm pressure of the lumbar region, then disease of the kidneys may be inferred: and this inference will be the more likely to be correct, if suppression or retention of urine follow its alkaline character, and if sopor and the more malignant symptoms become more fully pronounced than previously.

54. *After death* from this consecutive disease, or complication, both kidneys are found congested or inflamed, but one is often more affected than the other. They are always more vascular, redder and larger than natural. At the surface and in the vascular structure, numerous red points, intermingled with purulent specks, are sometimes observed; and the substance of the organ is of a deeper or darker hue than usual, and softened in parts, or torn with greater facility.

55. *b. Consecutive Nephritis* often proceeds from the *absorption of purulent or sanious*, or *other morbid matters* into the circulation. When these matters pass into the blood, and more especially when they are imbibed by the veins, they contaminate this fluid; and the kidneys, being the most active organs in eliminating or excreting them from the system, are especially exposed to their injurious influence. Hence *asthenic nephritis* often occurs in the course of *phlebitis*, especially of *uterine* and *traumatic phlebitis*, of the more acute forms of *tubercular consumption*, of *diffusive inflammations* of the cellular substance and of *diffusive abscesses*, and after the rapid absorption of purulent matter from the more *chronic abscesses*, especially from *abscesses of the liver*. — In these cases, various changes in the urine have been observed. It has been generally alkaline, often puriform or muco-puriform, thick, scanty, and ultimately suppressed; a morbid state of the perspiration, adynamic fever, sopor and coma, with other typhoid and malignant symptoms appearing towards the close of life. — In some cases a large quantity of pus, with some mucus, is voided in the urine, shortly before the affection of the kidneys supervenes; but as it becomes fully developed, so pain in the loins, scanty, painful, and frequent micturition, with the other symptoms of nephritis are observed, and precede the sopor and other typhoid symptoms, which are the consequence chiefly of the partial or total suppression of urine caused by the consecutive nephritis. — *On dissection* the kidneys generally are found containing, in their vascular and tubular structure, small collections of pus; the structure immediately surrounding these being softened, of a dark or brownish hue; or paler, especially in patches, and infiltrated with purulent matter. Occasionally the tubular structure seems filled with pus; and, in rarer instances, the renal veins have been found inflamed.

56. *d. Nephritis is often consequent upon the eruptive fevers*, more particularly upon *scarlatina* and *small-pox*. Its connection with *scarlatina* is of two kinds: — 1st, it may appear in the course of this fever; and 2d, it may not take place until the fever has subsided, or until the advanced progress of convalescence from it. — (*a*). When it occurs in the *course* of scarlatina, it generally assumes very nearly the same features as have been noticed in connection with *typhoid fevers* (§ 7.), and is extremely acute, the urine being either suppressed, or very scanty, dark-coloured, bloody, or abounding in blood-globules, albuminous, and passed frequently, in drops merely, or in very small quantity and with much pain. These attacks of nephritis are either consequent upon a premature disappearance of the eruption, or on an imperfectly developed state of it; or it complicates the more malignant states of scarlatina, and causes its rapid termination in coma, &c. — (*b*). Where nephritis appears during *convalescence* from scarlet fever, it is more frequently of that particular kind, which has been called *albuminous nephritis*, or *granular degeneration* of the kidneys, and which I have viewed, since it was first described by Dr. Bright, as a form of inflammation of these organs; and as such it has also been recently considered by M. Rayer. When this state of disease is discussed, then its connection with scarlatina will be fully noticed.

57. (*c*). *Asthenic nephritis* also occurs during *small-pox*, particularly its confluent and malignant forms. In these cases, the urine is very scanty, alkaline, muco-puriform, or bloody and sometimes nearly black; or it is altogether suppressed. When this complication of small-pox takes place, all the characters of the disease assume an aggravated or more malignant character, coma and other typhoid symptoms supervening. *After death*, the kidneys are found congested, ecchymosed, partially softened, of a dark hue, and, in rare instances, infiltrated with purulent matter.

58. *e. Nephritis is often consecutive of paraplegia*; and the influence of this state of *palsy* in causing it, is remarkable, whether the paraplegia proceed from injuries or from diseases of the spine or spinal chord. Nephritis may also be consequent upon *coma*, especially in low fevers, as above mentioned; whilst in these maladies, it more commonly produces or aggravates this and other adynamic symptoms than is supposed. When nephritis appears in these cases, it usually proceeds from retention of urine, and the changes caused by this retention; for it rarely takes place

when accumulations of urine are prevented. Probably, however, the loss of that portion of nervous power supplied to the urinary organs by the spinal chord, has some influence in predisposing to inflammation of the kidneys; and in imparting an asthenic character to the disease, which, in these circumstances, is attended not only by retention of the secretion, but also by a very alkaline, offensive, or ammoniacal state of it, indicating the existence of disease of the bladder. Indeed the alkaline, or ammoniacal, or offensive odour of the urine in these cases, arises from the partial decomposition of the mucous and other animal matters in it, whilst the urine is retained in the pelvis of the kidney and in the bladder. In these cases the *structural changes* in the kidneys are nearly the same as are met with after other consecutive inflammations of these organs, as already described.

59. *f. Nephritis is often consecutive* of prolonged disease seated in the *urinary bladder*, or in the *prostate gland*, or *urethra*. The frequent and continued irritation of the *urinary bladder* from inflammatory action of its mucous membranes or of its mucous follicles, may occasion congestion or inflammatory action of the kidneys, owing to the intimate connection depending on function, and nervous communication. Disease of the *prostate gland*, when of long duration, or when it interrupts the discharge of urine, is also apt to be followed by inflammation of the kidneys either with or without calculous formations or gravel, these latter more frequently occurring in the gouty diathesis in connection with the prostatic disease. The pressure also of *stone* in the bladder, by the irritation it occasions in this viscus, and in the neck of the organ and prostate, in connection with the interruptions it produces to the free discharge of urine, often gives rise to inflammation of the substance, as well as of the pelvis of the kidney. In some of these diseases, the morbid action seems to extend from the bladder along the ureters to the kidney, as shown by the inflammatory action and its consequences observed in one or both these ducts. *Strictures of the urethra*, more especially where they produce retention of urine, are not infrequently followed by acute or chronic nephritis. As respects all circumstances, in which the disease appears consecutively of disorder or structural change of some other portion of the urinary passages, it should be recollected that it is often chronic, sub-acute, slow, and insidious in its progress; that it requires close and careful examination of the physiological symptoms, and of the appearances and states of the urine, to detect it; and that its progress, as well as its accession, is often masked by the symptoms referred to the bladder, urethra, and perinæum, where they are most severely felt, as well as by those attending the excretion of urine. When nephritis is thus superinduced, its indications are to be found chiefly in connection with the seats of primary disorder, with the powers of retaining the urine, with the frequency of passing it and the quantity passed, with appearances and characters, and with its partial or total suppression or retention.

60. iii. OF THE INFLUENCE OF INFLAMMATION OF THE SUBSTANCE OF THE KIDNEYS IN PRODUCING OTHER MALADIES. — This subject was imperfectly noticed until Dr. BRIGHT directed attention to it in his researches in the *granular degeneration* of these organs. The consequences which arise from this particular state of disease will be stated hereafter. I shall confine myself chiefly at this place to the consideration of those which more immediately proceed from the states of nephritis already brought under consideration. It must be manifest that, where inflammation attacks those structures which are more especially concerned in the performance of the functions of the organ, that the discharge of these functions must be remarkably disturbed. It is well known that, like other glands, when the kidneys become inflamed, they experience a remarkable impairment of their functions. The membranes which surround them and support them, have the effect of compressing them, especially when their vessels are injected, congested, and inflamed, thereby increasing their incapability, arising from the inflammatory state, of performing their usual offices. The deposition, also, of coagulable lymph, either in considerable patches, or as an infiltration of the textures, further increases the pressure on the vascular and tubular structures, and otherwise interrupts the eliminating action of these organs. Whether, however, impairment, or interruption, or suppression of the functions of the kidneys be thus or otherwise produced, there can be no doubt of either the one or the other of these being the consequence of developed inflammation of the proper structures of these organs. Owing to this change — to this interruption — the fluid and saline matters requiring elimination from the blood accumulate in it, and the vascular system experiences a state of excrementitial plethora, giving rise to impairment of vital energy, to congestions of other viscera, and to effusions into shut cavities and cellular parts. During the earlier stages of this vascular disorder, and before the blood becomes so impure and so watery as to overpower the tone and reactive energy of the vessels, and hence to occasion congestion and loss of function of vital organs, a vicarious elimination of a portion of the injurious materials accumulated in the blood, takes place by means of the skin and digestive mucous surface, and in the form of aqueous vapour from the surface of the bronchi and air-cells. At last, however, if the functions of the inflamed kidneys are not restored, the brain becomes congested and oppressed, and serum is effused in the ventricles, and between the membranes. Hence the *sopor* and *coma* which occur in the last state of unfavourable cases of nephritis, and which supervene the more rapidly the more abundant and the more impure the blood has been previously to the occurrence of nephritis, as in the consecutive forms of the disease just considered.

61. Even when a vicarious action is exerted by the skin and mucous surfaces during inflammation of the kidneys, yet these are incapable of evacuating several or all of the elements or materials requiring excretion from the blood, and of combining them into those forms which facilitate their discharge. The blood, therefore, must become, not merely loaded with these materials, but further changed, and even rendered morbid or noxious, by the influence they exert upon the hæmatozine or principal constituents of this fluid. Hence a state of actual cachexia, of a most acute and malignant nature, particularly in respect of its consequences, is developed, the soft solids are ultimately universally contaminated, and the body experiences a rapid dissolution as soon as life

departs. During the progress of these changes in the blood, produced by the accumulation in it of aqueous and effœte matters, various local diseases may appear as consequences of this excrementitial plethora, and contribute to hasten a fatal result, or concur with others in producing it; or these consecutive maladies may subside, if they be not severe, upon the removal of the inflammation, and restoration of the functions of the kidneys. Thus diseases of the *digestive organs*, particularly of the *liver*, *asthenic inflammation* of the *lungs*, of the *brain*, of the *endocardium*, and of the *veins* or *arteries*, and *dropsical effusions*, may appear as results of the action of the impure and morbid blood on these organs. *Dropsy*, however, unless the more acute states of it and sudden effusions of serum, does not appear as a consequence so frequently of the inflammations of the kidney already considered, as of the more chronic and peculiar form of disease first described by Dr. BRIGHT.

62. Various other important consequences follow nephritis, and arise rather from the intimate connection subsisting between the kidneys and the parts consecutively affected, through the medium of nervous association and relations, continuity of surface, and intimate consent and connection of function. Many other diseases of the urinary and sexual organs proceed from a primary disorder of the kidney, more especially when such disorder is connected with the formation of gravelly and calculous substances, and with inflammatory irritation of the calices and pelvis of the organ; but to these a stricter reference will be made in the sequel. As to the part performed by slight or partial inflammatory action in the substance of the organ, in giving rise to the formation of gravel and calculi in the kidney, it is difficult to decide. It is not improbable that it may favour these deposits by obstructing the free passage of the urine along the tubuli; but there is much more reason to infer that these deposits take place, independently of pre-existing inflammatory action, from the superabundance in the blood of the elements or materials constituting them; and that when inflammation does occur, that it is rather a consequence than a cause of their formation, — that they proceed in the first place from impaired power of the digestive functions, in connection with an excessive supply of the articles of food abounding in the chief elements of which they consist, and consecutively of impaired action of the kidneys, probably sometimes in connection with partial congestions or inflammations.

63. iv. COMPLICATIONS OF NEPHRITIS. — It is obvious, even from what has already been advanced, that inflammations of the vascular and tubular structures of the kidneys will both supervene in the course of other maladies, being thus consecutive, and give rise, when it is primary, to various important changes in the economy, both of a local and of a constitutional kind. Owing to these circumstances, nephritis will often present itself in practice, as an *associated* or *complicated malady* — most frequently — 1st. With inflammation of the mucous membrane lining the calices and pelves of the kidneys; — 2d. With gravel or calculi in the substance or pelvis of the organ; — 3d. With inflammation of a portion, or of most of the investing membranes; — 4th. With disease of the ureters; — 5th, with disease of the bladder and prostate gland; — 6th, with stone in the urinary bladder; — 7th, with stricture in the urethra; and 8th, with any two or more of these. As already shown, the disease may be *further complicated* with one or other of the diseases, upon which it occasionally supervenes, or which it sometimes produces or developes. It is obvious that these associations of nephritis cannot receive a more particular notice at this place. To several of them attention will be paid hereafter; and others of them are fully treated of in the article URINE, URINARY BLADDER, and URINARY CALCULI.

64. v. PROGNOSIS. — The prognosis entirely depends upon the *progress* that nephritis has made, upon the nature of the *predisposing* and *exciting causes*, upon its *severity*, upon the *age* of the patient, and upon the circumstances of its being a *primary* and *uncomplicated malady*, or *consecutive* of, or *complicated* with, some other disease, either of the urinary organs or of some other viscus. The simple states of nephritis, particularly when occasioned by cold and humidity, or by turpentine or cantharides, generally yield to judicious treatment; but when the disease is consequent upon other affections of the urinary organs, or upon operations on any of these organs, or when it occurs in aged persons, or when it is so severe as to be attended by suppression of urine, or by incontinence of it, the prognosis should be unfavourable, or at least be given with caution and reservation. The prognosis ought also to be extremely unfavourable, when the disease occurs in the course of low, adynamic, and exanthematous fevers, or when it is productive of sopor or coma, or when any of the more important changes, either in the blood or in other organs, which it has been shown occasionally to cause, is unequivocally manifested. The occurrence of retention, or of suppression, of urine, in aged persons, who have been the subject of incontinence of it, or of the more chronic symptoms of urinary disease; or the supervention of the acute attack, upon a slight or chronic state of the malady, is always most dangerous. In every instance, when the symptoms indicating the accession, or the presence, of suppuration, abscess, or of any other unfavourable consequence of nephritis, are manifested; or even when the disease has not yielded to a judicious treatment within the period assigned to the acute form of the malady; when the urine becomes alkaline, offensive, and purulent, as well as scanty, and the perspirations are urinous and copious, the constitutional symptoms indicating depression of the powers of life, obscuration or oppression of the cerebral functions, and contamination of the circulating fluids; and when a severe attack of nephritis occurs in the advanced progress of disease of some other organ, or of low or exanthematous fevers, then a most unfavourable prognosis of the result should be given.

65. When disease, also, of the bladder supervene on a chronic affection of the kidney, owing to the morbid state of the urine; and more especially if suppuration occur about the neck of the bladder, in consequence of irritation, inflammation, or other lesion of the kidney, a very dangerous state of disease is present, more particularly when it occurs in aged persons, or in those who have been subject previously to disorder of the digestive or urinary

organs. In these cases, the disease of the one organ reacts upon the other, and thus both are aggravated to a most dangerous extent.

66. vi. TREATMENT. The treatment of nephritis is subordinate to the causes, particular form, complication, and state of the disease, to the progress it has made, and to the age and constitution and previous ailments of the patient.

67. *A. Treatment of primary and simple Nephritis.*—*a.* When the disease proceeds from a concussion, sudden jerk, contusion, injury, or wound, early and even repeated *bloodletting* ought to be then especially prescribed, and the patient should be restricted to an antiphlogistic regimen; *diluents* and *demulcents* being allowed in small or moderate quantity. Of these, linseed tea, barley water, the *mucilages*, the usual *emulsions*, &c., are the most appropriate. Anodyne or opiate *fomentations* or *poultices* may be placed upon the loins; and the patient may have recourse to a tepid, emollient, or slightly warm bath, on the following day. If the pain and other symptoms continue notwithstanding this treatment, or if they be only partially removed, or if symptomatic fever is still considerable, more blood should be taken away; and it may be taken by cupping or by leeches—the former being the preferable mode; but the quantity should be prescribed without reserve, for too copious vascular depletion is less injurious in this disease than in most others, and much less so than a too sparing recourse to this measure. The smallness or contraction of the pulse should not deter from copious bloodletting, especially if the local and symptomatic pains are severe, and if retching or vomiting are frequent. In these cases, the pulse will become fuller and more developed by depletion.

68. (*b*). M. RAYER remarks, that, if the inflammation is caused by a *wound* of the kidneys, and the fever has been subdued, and the pain is inconsiderable; and if the discharge of some pus in the urine indicate the supervention of suppuration, bloodletting should be abstained from, and a severe regimen and regular dressings of the wound prescribed. If the suppuration is prolonged, the diet ought to be more generous, as a certain degree of power is favourable to recovery; whilst too great severity of regimen may retard recovery, and is only applicable when the injury or wound has extended to the peritoneum, or has complicated the nephritis with enteritis or peritonitis.

69. (*c*). When nephritis is caused by cantharides, by turpentine, by iodine, or by acrid diuretics, in too large doses, or too long employed, and the disease is slight, a moderate bloodletting, demulcents, and tepid baths soon remove the disease. If the symptoms, however, persist, these means should be carried still further, according to the circumstances of the case. Camphor has been recommended when the disease has been caused by cantharides; but it should not supersede bloodletting. It is an excellent adjuvant of other means, particularly when conjoined with oleaginous, mucilaginous, or demulcent substances, and given in small or moderate doses.

70. (*d*). Nephritis, caused chiefly by *cold* and *humidity*, in strong, young, or plethoric persons, requires an active recourse to general and local bloodletting, and the antiphlogistic and emollient means above advised. If the symptoms are merely abated, cupping, or a repetition of it, over the loins, must be prescribed, and demulcents taken by the mouth and administered in enemata. For nephritis from this cause, tepid or gently warm baths, and sudorifics conjoined with emulsions and anodynes, are especially indicated. In this, as well as in other states of the disease, the *bowels* should be kept in an open state; and, for this purpose, castor oil, or sweet oil, or both, may be prescribed and administered in demulcent vehicles. In some cases, after the disease has been, even for some days, apparently subdued, chills or rigors return, followed by pain in the loins, febrile reaction, and other symptoms of a recurrence of inflammation. When this is observed, a large bloodletting ought to be prescribed, unless the patient be far advanced in life; and, in this case, cupping on the loins, and the abstraction of eight, ten, or twelve ounces of blood, may be sufficient. When the symptoms lead to the inference that the *investing membranes* are chiefly affected, then the depletions should be copious, and calomel, with antimonials, or with other diaphoretics, ought to be freely prescribed.

71. (*e.*) *Sub-acute nephritis* requires a similar treatment to that above advised; but vascular depletions need not in general be carried so far as in the acute form. One large cupping over the loins may be sufficient; but it will often be necessary to repeat it; and, although this state of nephritis may not be so severe, it may be more obstinate than that already considered, and when both kidneys are affected, the treatment should be more energetic. The other means just mentioned are also appropriate in this state of the disease; or the diet and regimen should not be materially different from that directed for the acute form. The use of animal food, and of fermented and spirituous liquors, ought to be especially avoided.

72. (*f*). *Chronic nephritis* is often removed with much more difficulty than the acute attack; for, as it often has proceeded far before it has come under treatment, and is frequently caused and perpetuated by calculi in the kidney, the most judicious means may produce only temporary benefit. It is generally rendered more obstinate by the continuance of the habits and modes of living usually pursued by the patient during the treatment, notwithstanding the injunctions of the physician to the contrary. Generally one or two cuppings on the loins, with the antiphlogistic regimen, aided by a strict avoidance of animal food, and of exciting beverages, will remove the disease, or very remarkably ameliorate it, even when calculi have produced it; but farther measures are often necessary, particularly when it proceeds from this cause. Having, in such cases, carried vascular depletions and other antiphlogistic means as far as may seem prudent, some permanent external derivative will be requisite, in order to supersede the irritation still existing in the kidneys. *Issues* or *setons*, in the loins, or in the insides of the thighs, kept freely discharging for a considerable time, and the internal use of the preparations of the *diosma*, or of the *uva ursi*, with demulcents, with alkalies, or with acids, especially the muriatic or nitro-muriatic, according to the state of the urine, which ought always to be carefully and even chemically examined, are often the most beneficial means which can then be advised, particularly if they be aided by a suitable diet and regimen.

73. If either the *sub-acute* or *chronic* states of the disease suddenly assume an *acute* or *hyper-acute* form (§ 14—17.),—a circumstance by no means uncommon, — the means advised for acute nephritis (§ 67—70.), ought to be most promptly and energetically employed.

74. *B. The Treatment of the Modified and Consecutive Nephritis* (§ 46. *et seq.*) necessarily varies with the diathesis of the patient, and with the disorders or maladies occasioning it.—*a. Nephritis in the Gouty Diathesis* (§ 47.) is generally removed by *cupping* on the loins, and abstracting *blood*, according to the age, strength, and habit of body of the patient; by derivatives applied to the lower extremities; and by diluents or demulcents containing some one of the alkalies or alkaline earths, and anodynes. Magnesia or soda, with colchicum, or these with cathartics or purgatives, a vegetable or bland diet, attention to the digestive functions, and avoidance of heating and exciting ingesta, are also of great service.

75. In robust and plethoric persons general bloodletting is often necessary at the commencement of the treatment; and when the inflammatory action is perpetuated by the irritation of calculi or of gravelly matter, local depletion should be repeated, and demulcents, combined as above, should be assiduously employed. When the disease passes into a *chronic form*, the treatment recommended for *chronic nephritis* (§ 72.) ought to be prescribed, and the infusion of *Pareira Brava*, or of the *diosma crenata*, aided by the alkaline mineral waters and external rubefacients, freely employed. When gravelly or chrystallised substances are voided, or when their presence in the tubuli uriniferi is inferred, these remedies and the means already advised should be persisted in for a considerable time. This form of nephritis is not readily removed when it assumes a chronic form in old gouty subjects, or when it has been neglected in an early stage or in previous attacks. In these cases more especially, much attention is requisite to diet and regimen, and to the state of the evacuations. The biliary secretions should be promoted, and the bowels kept freely open by stomachic purgatives and moderate doses of the milder preparations of colchicum. When the stomach is irritable and flatulent, or when nausea and vomiting occurs, *creasote*, with small doses of opium, and with magnesia or some alkaline preparation, in demulcent and aromatic mixtures, is often extremely serviceable.

76. *b.* Rheumatic nephritis (§ 50.) has been shown above to be so obscure in many cases, as to render it difficult to determine how far the kidneys are really affected. When, however, the symptoms particularised above are present, there can be little doubt of those organs being *acutely*, or *sub-acutely*, or chronically inflamed; and still less of the propriety of having recourse to cupping on the loins, to demulcents and diluents; to the infusion of *diosma* or of *Pareira*, or to the decoctions of marsh mallows, of guaiacum, of senega, &c., with alkalies, with colchicum, &c. When the attack is severe and the patient is strong or plethoric, general bloodletting should precede the cupping on the loins, and external derivatives, particularly to parts previously the seat of rheumatism, ought to be applied. The turpentine embrocation may also be prescribed to the loins, and morbid secretions and fæcal accumulations duly evacuated.

77. If any dread of the occurrence of *endocarditis* or *pericarditis* be reasonably entertained, camphor may be given with mercurials and opium, or the decoction of senega or of guaiacum, may be taken with alkalies, anodynes, &c., and external derivation by means of open blisters, issues or setons, or by rubefacients, assiduously employed.

78. *c.* For *Secondary* or *Consecutive Nephritis* (§ 52.), the treatment must depend chiefly upon the states of vital power, of vascular action, and of the circulating fluids. In proportion as the vital energy is depressed or sunk, and the blood contaminated, and as the disease consequently assumes an *asthenic* character, so should vascular depletion, even locally, be resorted to with caution, or be altogether withheld. In these cases, the capillary circulation of the kidneys is interrupted, the vessels are congested and incapable of reacting upon their contents, and the secreting function is impeded or altogether suppressed. In these circumstances, although local depletion, especially cupping on the loins, may partially unload the weakened and congested vessels, yet it cannot restore the nervous or vital power of the kidneys so as to enable them to perform their functions. We often find in the more severe of these consecutive states of nephritis, the secretion of urine altogether suppressed and both organs affected, particularly when occurring in the course of continued or eruptive fevers, or after the absorption of morbid secretions into the blood, or after injuries of the spine. When this is the case, but little benefit results from cupping on the loins or from other modes of vascular depletion, unless means be used at the same time to rouse the action of these organs. The choice and application of these means are, however, amongst the most difficult things in practical medicine. Indeed the practice in these circumstances can only be experimental, endeavouring, however, to suit the remedies to the pathological states inferred to exist at the time of prescribing them, and to the sensible qualities of the urine. In most of these cases, especially when the disease is consecutive of *paraplegia* (§ 58.), or *coma*, the urine is more or less alkaline, and is probably secreted in this state, although the partial decomposition or change of the mucus secreted by the urinary mucous passages may further increase it. The mineral acids, particularly the *hydro-chloric*, conjoined with *hydro-chloric ether*, and given in tonic, antiseptic, and restorative vehicles, seem to be the most appropriate medicines to these cases. *Camphor* may also be tried in conjunction with nitre or the chlorate of potash; and embrocations containing this substance and the spirits of turpentine may be applied on the loins; or this latter may also be given internally in small doses, with the view of exciting the nervous energy of the kidneys and the action of the congested vessels. When, however, the patient is plethoric or robust, and vascular action and tone are not remarkably reduced, the abstraction of blood from the loins by cupping should precede the use of the above remedies, and should be carried as far as the states of vital power and of the circulation may permit. When vascular depletion cannot be further prescribed,

4

dry-cupping on the loins may still be had recourse to.

79. For the form of asthenic nephritis which sometimes occurs in the course of low fevers, or in consequence of the absorption of morbid secretions into the blood (§ 53—57.), the remedies now recommended may be tried, particularly dry-cupping, camphor, the chlorate of potash, the chlorides, hydro-chloric acid and ether, nitre and the spirits of nitric ether, stimulant and rubefacient embrocations and blisters on the loins, or other derivatives; but little dependence can be placed on medicines when this state of the disease is attended by a total suppression of the urine, as observed in the worst cases of it, and more especially if coma or convulsions have taken place.

II. CACHECTIC NEPHRITIS. — SYN. *Granular disease of the kidneys; Renal disease accompanied with secretion of albuminous urine*, Bright. *Diseased state of the kidneys connected with albuminous urine*, J. Gregory. *Granular degeneration of the kidneys*, Christison. *Albuminuria*, Martin-Solon, Willis. *Morbus Brightii, Maladie de Bright*, Auct. var. *Nephrite albumineuse*, Rayer. *Nephritis cachectica, N. sociata, Associated Nephritis, Nephritis from constitutional vice, Nephritis from a morbid state of the blood, Inflammation of the Malpighian corpuscles*, Author.

80. DEFIN. — *Uneasiness or pain in the loins, pallid or cachectic appearance of the countenance, disorder of the digestive functions, more frequent calls to void urine than natural, this fluid containing albumen, and being of less specific gravity than usual, owing to a diminution of its salts and of urea, dropsy or some visceral disease appearing in connection with the morbid states of the urine.*

81. PATHOL. CHARACT. — *A morbid state of the blood, characterised chiefly by the presence of urea and deficiency of albumen, and of hæmatosine, in connection with lesion of the circulation, minute glandular bodies, and structure of the kidneys, with various organic changes in other viscera, and generally with serous effusion into the cellular tissue and shut cavities.*

82. A general idea may be formed from the above definitions of the view I intend to take of this disease, which has attracted much attention since it was discovered by Dr. BRIGHT, yet not more attention than its real importance deserves. Although medical writers of high authority have fully investigated this malady, still certain topics connected with both its pathology and its treatment, the particular tissue of the kidneys primarily affected in it, require further elucidation. Indeed, the connections subsisting between it and morbid states of the blood, and between it and many visceral maladies, still require a full exposition, and to these topics further notice will be directed in the sequel.

83. i. DESCRIPTION. — Cachectic nephritis assumes two forms, the *Acute* and the *Chronic*, the one gradually passing into the other, although sometimes sufficiently distinct, in respect of the course of individual cases, to warrant this distinction, which has been made by both Dr. CHRISTISON and M. RAYER. The *acute* form is frequently *febrile*, or attended by marked vascular reaction; the *chronic* is *non-febrile*, and although the pulse may be accelerated, it is usually compressible or soft, or even small and weak. The *symptoms* may be *acute* at the commencement, but pass into those of the *chronic* in the course of the disease; and after having thus assumed the chronic state, exacerbations of febrile states may occasionally take place: but in either form, especially in the chronic, it may present a variety of aspects — numerous modifications — according to the previous circumstances, disorders, or predisposition of the patient, and to the various affections either associated with it at its commencement, or appearing in its progress.

84. *A. Symptoms of Acute Cachectic Nephritis.* — This form of the disease is frequent among children after scarlatina, especially during certain epidemics, and also in adults after exposure to cold and humidity, and to sudden changes of temperature; but is much less common than the chronic. It often is ushered in by shivering or chills, followed by the usual symptoms of fever, particularly a hard pulse, heat and dryness of the skin, and restlessness. A dull aching or pain, or a sense of uneasiness or of weight, or of constriction, is always felt in the loins, sometimes more in one side than in the other: but M. RAYER believes that these feelings are never so severe as in simple nephritis; nor are they attended by retraction of the testes, nor by pains darting in the direction of the ureters. Dr. CHRISTISON, however, has observed, in some cases, pain extending down the inside of the thighs and to the genitals. At the same time with the occurrence of these symptoms, the *urine* quickly becomes scanty, occasionally nearly suppressed, highly albuminous, and occasionally even bloody, or of a reddish colour, resembling the washings of fresh meat. It is always acid; and its specific gravity is often above, seldom below, that of healthy urine, the proportion of urea and of the saline ingredient not being materially altered, according to M. RAYER; but such is the case only at the commencement of the disease. When allowed to rest, the urine deposits a filamentous substance, apparently of a fibrinous nature. The odour of the urine is feebly urinous; but at the end of twenty-four hours it resembles that of beef-soup. When the albuminous and sanguinolent urine is first voided, it may be seen, by aid of the microscope, suspending a number of blood-globules, also the globules of mucus and minute lamellæ of epithelium; all which, with the fibrinous substance, forms a sediment when it is left some time at rest. There is frequently distress, or even pain, in voiding the urine, occasioned by sympathetic irritation of the bladder and urethra, increased by the difficult passage, in some cases, of the fibrinous substance along the urethra; and the calls to pass it are more frequent than usual. The quantity of urine is much less than that of fluids taken. There is always more or less fever. The tongue is furred or loaded, and the bowels confined. Nausea and vomiting occur, sometimes with pain across the epigastrium, and cough is occasionally present.

85. Very soon after these symptoms have been developed — generally within twenty-four or forty-eight hours — signs of *dropsical effusion* appear, and proceed with great rapidity, affecting first the eye-lids and whole face, or the limbs, and extending to the other parts of the body. The skin is hot, end does not pit, unless after very firm pressure. If *blood* be drawn at this time, it is always buffy, — sometimes very remarkably so, and the serum is occasionally milky. At the commencement of the

disease the serum coagulates nearly as in health, but in a very few days the coagulum furnished by the serum is much less firm, and this fluid becomes specifically lighter. The greater the quantity of albumen in the urine, the lower is the specific gravity of the serum; and as the albumen becomes less abundant in the urine, so the density of the serum increases. According to the researches of Dr. CHRISTISON, urea may be detected at an early stage of the disease in the blood.

86. The *terminations* of the acute form of the malady are — 1st, In restoration to health; 2d, In the chronic state; 3d, In coma, or convulsions, or both; 4th, In pleurisy, or in inflammation of some other serous surface; and in death, usually preceded by one or other of these more acute affections. — *a. Recovery* often takes place rapidly under judicious treatment, especially after scarlatina or during pregnancy; and is commonly indicated by profuse and general perspiration, by a copious discharge of urine, by a diminution of the albumen, and increase of the urea and salts in the urine, and by a subsidence of the febrile symptoms and of the anasarcous swellings. — *b.* The *chronic state* is generally shown by the subsidence of the febrile and acute symptoms, and often of the anasarca; the urine, however, still continuing albuminous. — *c.* The occurrence of *coma*, or *convulsions*, or of both, is generally a fatal indication. — *d.* The appearance of *pleurisy*, *pneumonia*, or *pericarditis*, or of any other visceral inflammation, or of *effusions* into shut cavities, is always a dangerous circumstance, and even in their milder states renders recovery protracted or even doubtful, especially if the urine still continue albuminous.

87. *B. Symptoms of Chronic Cachectic Nephritis.* — This form of the disease is sometimes consequent upon the acute, but it is incomparably more frequent without any febrile or active stage — latent and obscure in its origin; and it is a very much more common malady than the acute. It generally occurs in persons of an original or an acquired constitutional taint, or in those whose vital powers have been depressed or exhausted, and their assimilative functions and circulating fluids deteriorated, by previous disorder (§ 141.), or by exhausting, depressing, or other injurious circumstances, as exposure to cold and humidity, insufficient or unwholesome nourishment, &c. For a long period, there is no disorder sufficiently severe to withdraw the patient from his usual occupations, or even to attract particular notice, until gradually increasing debility, or an unhealthy or pallid countenance, alarms him or his friends, and then, if the medical adviser is alive to the nature and frequency of the malady, the urine is found specifically lighter and more or less albuminous, its solid ingredients being deficient. Not infrequently, almost contemporaneously with, or rapidly consequent upon, debility, pallor of countenance, or still more manifest cachexia, some serious visceral disorder or disease is developed, and proceeds *pari passu* with, or even outstrips, the renal malady and the symptoms by which it is indicated. Dr. CHRISTISON remarks, that, in cases apparently the most obscure in their origin, the urine has been very long scanty, or on the other hand too abundant, or occasionally of a cherry-red colour from a little blood, — or that it was passed frequently, and with difficulty or with pain, — or that there were frequent gnawing pains in the loins or flanks, extending at times to the thighs or groins. He further remarks that no symptom is so invariable, or indicates so truly the commencement of the disease, as the patient being regularly awakened once or oftener in the night by the call to pass water.

88. The disease may thus advance in obscurity, particularly in scrofulous persons, for months or even for years, until either the state of the urine attracts attention, or some incidental cause aggravates the disease, or renders it more acute, or developes a partial or general anasarca, or some associated or secondary malady. It is, however, generally indicated by reduction of strength, slight emaciation, by pallor or sallowness of the countenance, by a dry state of the skin, and want of perspiration during exercise, a frequent tendency to drowsiness, various dyspeptic symptoms, or a weakness of digestion, and occasionally sickness or even vomiting in the morning or when first awakening from sleep, slight thirst, and the other symptoms above mentioned (§ 87.). The countenance presents an uniform paleness, or a pale dinginess, which becomes more marked, and attended by manifest anemia, as the malady advances. The altered state of the urine and of the blood, the dropsical effusion, and the unhealthy complexion, are the most invariable and characteristic symptoms, and require a more particular notice.

89. *a.* The *urine* when first passed is generally slightly acid, but in a few cases it is neutral, or even alkaline. It is always pale in the advanced or chronic stage, sometimes more or less opaque, or like whey, suspending small whitish flocculi. Its odour is faint, and very different from that of the healthy secretion: its specific gravity is generally below, sometimes very considerably below, that of the urine in health. The want of transparency is occasionally owing to fatty matter held in suspension, which may be removed by means of sulphuric ether, when the urine becomes clear. Examined by the microscope, albuminous urine generally exhibits numerous small thin lamellæ of a whitish colour, often blended with mucous matter, which is either amorphous or in the form of globules. A vessel containing this urine usually presents on its sides or on the surface of the fluid a number of bubbles; and when air is blown through a tube into it, a multitude of large bubbles are formed. The application of heat forms in it an albuminous coagulum, or small coagula, which are remarkable in proportion to the quantity of albumen. Nitric and other strong acids, and a solution of the bichloride of mercury, produce a similar effect. The yellow cyanuret of potassium and iron also coagulates albuminous urine, if it has been previously acidulated with acetic acid. A sediment sometimes forms after it has been passed, which is commonly lithic acid or the lithate of ammonia, and which is re-dissolved at a gentle heat, lower than what is required for the coagulation of albumen. Besides containing albumen, the urine deviates from the healthy standard in containing an unusually small quantity of its solid ingredients. This urine is also more prone, than healthy urine, to decay; a decidedly ammoniacal odour being occasionally soon developed after it has been discharged.

90. Dr. CHRISTISON remarks that this urine at the boiling point sometimes forms a gelatinous mass; more frequently it becomes a soft pulp like thin custard; often too, when the quantity of al-

bumen is less, there are distinct flakes in a separable fluid. The earlier the stage of the disease, the more is the urine loaded with these flakes, and the more does it form of a pulpy or gelatinous mass. Nitric acid acts in like manner; but it separates the albumen always in the form of flakes or pulp. It is advisable to use the tests both of heat and of nitric acid; for, if the urine be ammoniacal, heat may fail of coagulating the albumen although the proportion of it be considerable; and heat alone may occasion a flaky precipitate where there is no albumen, owing to the superabundance and consequent separation of earthy phosphates — a deposition which nitric acid will both prevent and remove. Also, nitric acid alone may occasion a flaky precipitate of lithic acid, which, however, is re-dissolved by an elevation of temperature, whilst albumen remains insoluble. To avoid all sources of error, the urine should be tested before it decays or becomes ammoniacal. In the early stage of chronic cachectic nephritis, the chief characters of the urine are, a moderate reduction of its specific gravity, a strong albuminous impregnation, and a material diminution of the daily discharge of solid ingredients — of the urea and saline substances.

91. As the disease proceeds, the albumen often is diminished in the urine, or even suddenly and for a time disappears. When it has made considerable progress, the quantity of urine is often but little reduced; frequently it exceeds rather than falls short of the healthy ratio; and in some cases, the amount has continued for weeks as much as double or treble that of health. But the quantity may be diminished either when the exciting causes develope an acute state of the disease in the course of the chronic, or when coma, stupor, or intercurrent inflammations take place, or when the granular degeneration has reached a certain or great extent. As disorganisation advances, the density of the urine sinks from about 1021 to 1026, which it usually presents at an early stage, to 1016, 1014, or 1012; and when it has proceeded far, the density is generally as low as 1010 to 1007, even although the quantity be rather under than over the natural standard. The lowest density which Dr. CHRISTISON has ever noted, where the quantity was not in excess, was 1004. A low density, he remarks, is an essential character of the urine in the middle and final stages, whether the quantity be great or small; and the density goes on diminishing as the disease advances. When disorganisation of the kidneys has proceeded very far, the albumen very frequently, if not generally, disappears altogether, and may not reappear unless acute symptoms occur. In this stage the chief characters of the urine are a great reduction of its specific gravity and an equal reduction of the daily discharge of solids — of urea, lithic acid, and salts, frequently associated with the presence of albumen in small quantity.

92. *b. Dropsical effusion* into the cellular tissue, or into shut cavities, or into both, generally takes place in the course of chronic as well as of acute cachectic nephritis; but the alterations of the urine described above may continue for many months before it appears, and without being attended by any disturbance besides debility, impaired appetite, and an unhealthy appearance of the countenance. However, if the patient be not carried off by some casual disease, or by some of the attendant or contingent maladies which so frequently complicate cachectic nephritis, he will certainly become dropsical sooner or later. Anasarca is the most common form of dropsy, the eyelids and face becoming puffy in the morning, and the ankles and feet œdematous in the evening. When œdema of the lower extremities is caused by this malady, it does not so readily or so entirely subside in the morning, as when it is produced by disease of the heart. M. RAYER justly remarks that nephritic anasarca is more sensibly and rapidly aggravated by exposure to cold air, than any other form of anasarca; and I have observed the chronic form of the nephritic disease suddenly changed into the acute by this cause, with a rapid increase of the anasarca, and with effusion into the serous cavities. Ascites not infrequently supervenes, especially when disease of the heart or liver is associated with disorganisation of the kidneys. Effusion into the pleuritic and pericardiac cavities, sometimes also occurs in the advanced stage of this malady. Urea is generally detected in the effused serum, besides albumen and the usual saline substances.

93. *c. The blood* undergoes remarkable changes in this malady, especially in the advanced stage, as Dr. CHRISTISON has very ably shown. I believe that this fluid is affected at an earlier period than is usually considered, and generally before any dropsical effusion takes place, if not before the urine itself, or even the kidneys, betray disease. This, however, cannot be readily determined; for the state of symptoms does not always indicate the propriety of bloodletting, and the patient rarely has recourse to medical aid at so early a period. The questions are, whether or no the changes in the blood are consequent upon, and caused by, those of the kidneys, or whether the latter depend upon the former, or whether both proceed either coëtaneously or successively from some other state of disorder. These must be adverted to hereafter; at present I must note only the alterations which take place in the blood in connection with this malady. The *serum* of the blood is reduced in density, has more or less of a milky appearance, and it contains less solid matters. The amount varies in different cases — from 1029 or 1031, the density of health, to 1022, 1020, or even 1019; and the solid contents being reduced from 100 or 102 in one thousand to 68, 64, or even 61. The reduction is considered by Dr. CHRISTISON to affect the albuminous equally with the saline ingredients. It occurs only where there is an abundant discharge of albumen with the urine; but then invariably, owing to the loss of albumen, the serum coagulates loosely when heated. This physician established as early as 1829 an important fact, which has since been confirmed by several writers, namely, the presence of a large quantity of urea in the blood. He states that urea is invariably found in the serum at all stages of the disease where the daily discharge of it by the urine is materially diminished, that is, to about one-third of the natural amount. Hence it may be discovered in the early stage if the quantity of urine have not been much increased by incidental causes beyond the common average at this period; but if the urine be thus increased it may not be detected, or traces of it merely.

94. The proportion of *fibrine* in the blood is commonly increased in the early stage of the chronic malady, although not so greatly as in the acute

form. Dr. CHRISTISON considers the quantity of dry fibrine to vary in healthy blood from 25 to 52 parts in ten thousand; but in the *acute* state or stage of the disease, he has seen it as high as 82, and as low as 30 parts, the variation apparently depending upon the degree of general vascular reaction or local inflammation which is present. The proportion of *hæmatosine* or of colouring matter he believes not to be materially affected at an early stage, when the patient has enjoyed good health previous to the attack; but such a state of health I consider rarely to exist just before cachectic nephritis is produced,—rarely before even the acute form of the disease; many of the supposed cases of this form, occurring in healthy persons, being actually cases of simple nephritis, which also is often attended by a slightly albuminous state of the urine. I have never seen a case of this malady in a person who was quite healthy just before its commencement. All that is known of the state of the blood in the *early stage* is, that the serum is deficient in albumen, and that it generally contains more or less urea; and that the proportion of fibrine is often increased.

95. *d.* As the *disease advances,* the blood presents much greater changes than the above:—1st. It separates into a less bulky clot relatively to the quantity of serum, which is generally not so lactescent as in the early stage. The coagulum is also not so frequently buffed or cupped as in this stage or in the acute state; but it often assumes these appearances when general reaction or local inflammation supervenes. In many cases the clot is remarkably small and contracted, forming scarcely a fourth part of the whole weight of the blood.—2d. The density and solid contents of the *serum,* which were much reduced in the early stage, gradually return to the healthy standard or even exceed it at a more advanced period, unless when reaction occurs, and when the urine becomes highly coagulable. In the most advanced stage where there is very little coagulability of the urine, the density of the serum may amount to 1030, and the proportion of the salts and albumen to the entire blood may be as high as 970 in ten thousand, the healthy standard being 780 to 800 according to LECANU, and 816 to 853 according to CHRISTISON. Where, however, reaction or inflammation has occurred in this stage, both the density of the serum and the proportion of the solids are greatly reduced.—3d. The *urea* often disappears from the serum in the middle stage; but it commonly reappears in the most advanced stage, and is sometimes present towards the close in larger proportion than ever. This is owing chiefly to the quantity of urea and its combinations passed in the urine during the twenty-four hours, at these different periods of the disease.—4th. The *fibrine* is usually in natural proportion after the early stage is passed, and becomes abundant only when reaction is produced and when the blood is decidedly buffy. Dr. CHRISTISON states it to vary from 27 to 43 parts in 10,000 as the malady proceeds, and from 56 to 85 parts where reaction or inflammation occurs, the clot being thickly buffed.—5th. During the progress of the disease, the colouring matter, or *hæmatosine,* becomes gradually but rapidly reduced, and ultimately, if the patient be not carried off by some severe complication, it forms less than a third of the healthy average. In some cases the reduction is partly owing to bloodletting, but it is quite as great where no vascular depletion has been practised. On examining the blood with the microscope, the red globules are observed to be less numerous than in health, and mixed with them are seen other globules of a white colour and of a larger size than they. Dr. CHRISTISON observes that there is no chronic disease which so closely approaches hæmorrhage as this in impoverishing the blood. It thus appears that, in the advanced stage of chronic cachectic nephritis, the proportion of hæmatosine in the blood is invariably and greatly reduced: the other morbid changes are variable; the solids of the serum are most frequently defective, but sometimes in excess; and often, especially if the disease be very far advanced, the serum also contains urea.

96. The *leucophlegmatic* or sallow and bloodless state of the countenance, characterising the progress of the malady, is owing to the changes in the blood. A pale, transparent, waxy hue, is gradually induced; or a peculiar dingy or brownish tint, which is most frequently observed in persons of a dark complexion, although sometimes also in those who are fair; and readily suggests the probable existence of this malady when seen by the observing physician.

97. Besides the above changes and symptoms, there are generally a marked diminution of the perspiration, and more or less dyspnœa. There are sometimes also vomiting and diarrhœa. However profuse the latter may be, it rarely causes any sensible diminution of the dropsical effusion when this has taken place. The dyspnœa is generally owing either to bronchitis, to pulmonary œdema, or to hydrothorax, or to some other affection of the lungs or heart, which may have been antecedent to, contemporaneous with, or consequent upon, the renal disease.

98. *e.* The *duration* of chronic cachectic nephritis varies from a few months to several years. The time of its commencement is always ascertained with great difficulty, as patients frequently do not apply for advice until dropsy appears. Once the characteristic change takes place in the urine, some form or other of dropsy, generally anasarca, may be expected to occur, with much confidence, unless some intercurrent disease carry off the patient. When effusion does take place, it is impossible to say truly how long he may survive. In most instances, the dropsy continues until death—presenting, like the disease of the kidneys, remissions and exacerbations at longer or shorter intervals, or perhaps occasional amendments so considerable and so durable that the patient is enabled to attend to his affairs without interruption for months or even years; and until the disease, assuming a more active form, confines him to bed, and then terminates fatally more or less rapidly, in consequence of some secondary malady, as some cerebral affection, or pleurisy, pneumonia, pericarditis, gangrenous erysipelas, or obstinate diarrhœa, with or without vomiting and fever.

99. *C. Appearances of the kidneys after death.*—These appearances have been very fully described by the authors already mentioned, and especially by Dr. BRIGHT, Dr. CHRISTISON, and M. RAYER. The last-named writer describes *six forms* of organic lesion—*two* more especially be-

longing to the *acute*, and *four* to the *chronic* disease — presenting features more or less distinct or peculiar. But these forms of lesion may be found united in the same case, when the disease has attacked, successively and at longer or shorter intervals, different portions of the two kidneys. In almost every instance, both kidneys are affected, although very often unequally. In one case only have I seen the one organ very slightly altered when the other was very remarkably diseased.

100. *First Form.*—The size and weight of the kidneys are very much increased—from 4 ounces, their ordinary weight, to 8 or even to 12 ounces. Their consistence is greater, but they are not indurated; and their surface is morbidly red, and spotted over with a number of red points of a deeper colour than the rest of the organ. On dividing the kidney, the increase of bulk is found to be owing to tumefaction of its cortical substance, which exhibits numerous red spots similar to those visible on the surface, and which, according to M. Rayer, correspond to the glands of Malpighi, highly injected with blood. I have found these glands not only injected, but their central cavities either obliterated or filled with a whitish or yellowish granular matter, which I have considered to be albuminous in its nature. The tubular structure, compressed between the tumified prolongations of the cortical or vascular substance and the enlarged or tumid Malpighian bodies, is of a duller red, and its striæ are less apparent than in the healthy state. The mucous membrane of the calices and pelvis is sometimes injected, and exhibits vascular arborizations on its surface. This *first stage* of the disease is rarely observed as it seldom proves fatal until ulterior changes have occurred. It should not be confounded with congestion consequent upon disease of the heart or upon other maladies, nor with simple nephritis, in which latter the kidney is harder and redder, and almost always presents purulent points disseminated through its substance (§ 36.).

101. *Second Form.*—The volume and weight of the kidneys are still increased; but their consistence is not quite so great as in the first form. The lobules are more distinct than in health. The special character of this form is the very remarkable commixture of anæmia and hyperæmia, which gives a marbled appearance to the surface of the organs. On incision, the cortical structure is found still swollen, but it is now of a pale yellowish hue, spotted with red; and there is a marked line of demarcation between it and the tubular structure, the colour of which is reddish-brown.

102. *Third Form.*—The kidneys are still larger and heavier than in health; but they do not present any red patches or marbled appearances. The cortical substance, both on the surface and when divided, exhibits a tolerably uniform pale or whitish-red colour, passing into yellow; in some cases, it is still paler, and closely resembles the hue of the flesh of the eel. Minute vessels injected with blood appear here and there, and more rarely small brownish patches or large whitish granulations produced by an old deposition of lymph. The papillæ of the tubular structure often present red indurations; and the mucous membrane of the pelvis and calices is sometimes thickened and here and there injected; but these latter changes are also found in simple nephritis.

103. *Fourth Form.*—This form is what has been designated by Dr. Bright the *granulated texture* of the kidneys. The size and weight of these organs are still increased. Their external surfaces, usually of a yellowish colour, are dotted, and sometimes covered with minute spots of a milky-white with a yellowish hue, which are often elongated, appearing as if small portions of milk curd had been irregularly spread over them. These granulations are generally most numerous and distinct at the two ends of the organ: they are not prominent, the surfaces of the kidneys being quite smooth, but are imbedded in the cortical substance. On dividing the kidney from its convex to its concave side, its cortical structure exhibits, as in the second and third forms, a pale yellow colour, which contrasts strongly with the red line of the tubular substance. The cortical structure is swollen, and occupies a considerably larger space than in health, particularly in its prolongation between the cones. The milk-white spots, or granulations of Dr. Bright, instead of being rounded and distinct from each other, as they usually are on the outer surface of the organ, now appear like irregular flocculent lines, which seem to be continuous with the divergent striæ of the tubular cones. When the incision has been well made in the direction of these striæ, this arrangement is very distinctly seen, especially at the periphery of the kidney and the base of the cones, where the granular degeneration is generally most conspicuous. In some cases the granulations, although very distinct on the surface of the organ, can hardly be observed in the substance of the cortical structure; while in other cases they are scattered through every portion of it, even to the small prolongations which penetrate into the bases of the tubular cones. The granulations become distinct if the kidney has been macerated for some time in water; their dull white colour then stands out more obviously from the surrounding cortical structure.

104. *Fifth Form.*—The kidneys are larger, heavier, and have their lobules more distinctly marked, than in the healthy state. They appear as if a great number of minute grains of the semolina were sprinkled on their surfaces under their proper investing cellular membrane. These minute grains are Malpighian glands enlarged by albuminous infiltration, and are distinct from the yellowish particles sometimes observed in the cortical substance, which are also small granulations of lymph, accidentally met with in this and in other varieties of nephritis. This form of lesion is much more rare than the preceding; but, like them, are generally attended, during life, by dropsy.

105. *Sixth Form.*—This corresponds with the third variety described by Dr. Bright. The kidneys are sometimes larger, but often smaller, than in the healthy state. They are hard, and more or less irregular and tuberculated. Few, or perhaps none at all, of the milky spots or granulations are observed on their surfaces; but a certain number is always found when an incision is made into the cortical structure. The surfaces of the organs are indurated, corrugated, and mamallated; but, although studded over with minute asperities, they do not exhibit the genuine granulations of Bright. In some cases, how-

ever, the anatomical characters of this form of the disease are so closely alike to those observed after simple chronic nephritis (§ 22.), that it would be scarcely possible to point out the distinction between them, if the phenomena present during the life of the patient were not taken into the account. In this advanced stage of the disease the investing membranes are almost always thickened, at least in several points, and strongly adherent.

106. The other changes of structure sometimes observed in connection with the above forms of lesion are neither very remarkable nor necessarily connected with them. They may occur in any of the varieties of nephritis. Alterations of the ureters, urinary bladder, prostate and urethra, are merely coincidences, and are sometimes observed. But extensive changes of the lungs, heart, stomach, intestines, liver, serous membranes, &c., are very often found in addition to those existing in the kidneys, and are either primary, or consecutive upon the renal malady, and in either case more or less intimately connected with it. To this subject, however, more particular attention will be directed hereafter. Dropsical effusion most commonly exists either in the cellular tissue, or in the shut cavities, and much more rarely in the ventricles of the brain and in the spinal canal. The quantity of fluid effused is generally large. Sometimes the cellular tissue contains a gelatinous fluid instead of serum.

107. The above lesions, with the exception of those found in the *first* and *fifth* stages or forms of the disease, are nearly such as are described by M. RAYER. Besides these, however, there are various other alterations of the kidneys and urinary passages, which are occasionally seen in connection with them. Of these, the most important and intimately connected with the disease seem to be congestion or fibrinous concretions in the emulgent veins, and signs of inflammation or of its consequences in these veins: but these have not been observed either frequently or with requisite precision. The granular deposits and other changes described in the second and other forms of lesions above enumerated, are chiefly consequences of those described in the first form of the changes in the Malpighian bodies, and in the cortical structure generally, which, owing to the deposits of albuminous-like matter in them, present different appearances according to the amount of such deposits, and of the alterations of surrounding tissues occasioned by them. These alterations have frequently reached their furthest limits before death occurs, and before they come under observation.

108. I have already stated (§ 100.) that the granular deposits first noticed by Dr. BRIGHT in connection with dropsy, and described by him by the name of "*granular degeneration of the kidneys*," appear to originate in the glandular bodies of MALPIGHI. Since the time of this anatomist, and more particularly by FERREIN, BERTIN, SCHUMLANSKI, EYSENHARDT, and MAPPES, the Malpighian glandules or bodies have been viewed as the structure more immediately concerned in the secretion of urine. As such they have been described by MECKEL, CLOQUET, and others, who observe, that these bodies, glandules, or granulations, appear to consist of rounded corpuscles, visible to the unaided eye, in the form of very small points, which are connected with the minute and ultimate ramifications of the bloodvessels. Under the microscope, these bodies appear not only to consist of a reticulum of these vessels, but also to give origin to minute, white, tortuous canals, the conduits of FERREIN, which canals form a considerable portion of the cortical structure, and convey the urine from the corpuscles to the tubuli. MECKEL denominates these canals "the excretory canals of the Malpighian corpuscles." (T. iii. p. 557.)

109. From what has been stated above (§ 100.) I infer, that inflammation of the Malpighian corpuscles takes place in cachectic nephritis; that an albuminous deposit forms in them, giving rise to a granular appearance; and that, as the changes of these bodies and of the cortical structure advance, the other tissues are thereby altered more or less, until at last the tissues compressed by them become condensed or atrophied, and the substance of the organ further altered in consequence. These changes in the kidneys, which are nearly the same in both, especially the earliest changes, as the inflammatory state of the Malpighian corpuscles, and the commencement of granular deposits in them, are excited by previous changes in the blood, as contended for hereafter (§ 141. *et seq.*); and the associated maladies arise chiefly from the same cause, and from further alterations in it, owing to the morbid state of this very important emunctory.

110. ii. DIAGNOSIS.—*A.* The *acute form* of cachectic or albuminous nephritis is readily recognised by the co-existence of an albuminous, and often a sanguinolent, state of the urine, with the rapid development of anasarca, and occasionally of serous effusion into some internal cavity. In a few cases no dropsy takes place; but then the state of the urine, in connection with febrile irritation and derangement of the general health, will sufficiently indicate the nature of the disease. It may, however, be mistaken for simple *hæmaturia:* but in this latter, pure blood passes mixed with the urine; and fibrinous concretions or filaments, or even small clots of blood, are voided; whilst these circumstances do not occur in cachectic nephritis. In hæmaturia, moreover, one or both regions of the kidneys are more pained, and more tender on pressure, than in this disease. The urine also is rarely passed without pain, or having the same appearance at different hours of the day — circumstances rarely existing in this form of nephritis. In simple nephritis, and in some cases of the eruptive fevers, the urine contains albumen in a slight degree and for a brief period, but there is generally also a due proportion of urea, and the urates, and other saline matters, and hence the urine is not specifically lighter.

111. *B. The Diagnosis of Chronic Cachectic Nephritis* is more uncertain than that of the acute. When in a patient who experiences only trifling, if indeed any, pain in the loins, the urine is found of a low specific gravity, and contains albumen with only a small proportion of urea and the urates, the existence of chronic cachectic or albuminous nephritis is almost certain, especially if he be free from disease of the heart. And even when there is disease of the heart, the chances of mistake are small; for, if the congestion of the kidneys consequent upon disease of the heart give rise to the presence of albumen or of blood-glo-

bules in the urine, the quantity is small, and only occasionally observed; and the specific gravity of the urine, and the proportion of urea and urates, are not materially affected. The dropsical effusion also caused by disease of the heart usually commences in the lower extremities and extends upwards, whereas that arising from disease of the kidneys is often first perceived in the face.

112. M. Rayer remarks, that when, after a few days' indisposition, a patient is affected with serious cerebral symptoms, or with repeated attacks of vomiting, without dropsy, and when, at the same time, the urine is strongly charged with albumen and is of a low specific gravity, and if we cannot detect any disease of the heart, or of the bladder or urethra, the existence of chronic albuminous nephritis may be regarded as more probable than that of a primary cerebral affection. And if it be ascertained that the patient has been exposed to wet and cold, or addicted to the abuse of spirituous liquors, or affected with dropsy some months before, the presence of renal disease may be asserted with still greater confidence. The milky or whey-like appearance of the serum of the blood is no proof of the existence of the disease under consideration, for it has been seen very frequently by Hewson, Trail, Babington, myself, and others in various other diseases besides this; and urea has been found in the blood after simple nephritis and in atrophy of the kidneys, when the urine was not albuminous.

113. iii. Complications and Relations of Cachectic Nephritis to other States of Disease. — I have already stated that cachectic nephritis rarely occurs without some previous disorder or even actual disease, and that such disorder is generally characterised by impaired organic nervous energy, by imperfect assimilation, and by the consequently morbid state of the blood. I have moreover contended (§ 141. *et seq.*), that the inflammatory condition of the kidneys in the acute form, and the lesions of these organs in the chronic, are consequences of these antecedent morbid conditions; and that several of the affections which I now proceed to notice, in relation to cachectic nephritis, often exist in a slight degree, either previously to, or coëtaneously with, the development of this malady; whilst others, or even the same affections in different cases, do not appear, or at least are not manifested, until consecutively upon the renal disease. From this it will be evident that I view cachectic nephritis as a consecutive or secondary malady, and that the various affections with which it is more or less intimately connected are either pre-existent to it, or co-existent with it, or consequent upon it,— that they are all, in many instances, progressive manifestations of successive changes in the economy, affecting more especially the circulating, or the assimilating, or the excreting organs, according to their several predispositions to disorder, or to inflammatory action, or to structural change, or to the influence of incidental causes and external agents; whilst in other cases, certain of them may occur as coincident effects of pathological causes — of pre-existing disorder, especially of that already specified. It should be recollected that the associated affections or complications are rarely single, — that disease of several viscera, besides the dropsical effusion, generally appears in connection with the renal malady even in the same case; but this will be seen more fully in the sequel.

114. *A. Relations of Cachectic Nephritis to Disorders of the Digestive Organs.* — *a.* The *mouth* and *pharynx* are rarely affected in connection with this disease unless consecutively upon it, when aphthæ, and even ulceration of the pharynx, may occur at an advanced stage. It has been observed that mercurials more readily affect the mouth and salivary apparatus in the course of chronic cachectic nephritis than in most diseases.— *b.* The *stomach* is more or less disordered either previous to, or at an early stage of, this malady. At this early period the disorder of the stomach consists chiefly of the more severe symptoms of dyspepsia; but nausea and vomiting are frequently complained of, and generally occur early in the morning or when fasting, especially in persons addicted to intemperance. In these cases, stimulants and food relieve the symptoms, and often comparatively little loss of appetite is felt during the day. In the acute states of the renal disease, the disorder of the stomach is more or less severe; whilst in the chronic form this disorder varies,— is sometimes slight, at other times severe, or consists chiefly of a sense of load or weight at the stomach, with eructations, acidity, and other symptoms of indigestion. These disorders are generally functional; but structural changes of the stomach are sometimes coincident with the advanced progress of the renal disease, especially inflammatory states and softening of the villous coat, — ulceration, with or without perforation, of the coats of the organ,— and fungous or encephaloid tumours. In these cases, particularly where ulceration or perforation has occurred, thickening or induration of the margins of the ulcerated part, and adhesions of the adjoining viscera, may have taken place.

115. *c.* The *intestines* are more or less affected in many cases of this malady; and most frequently in the form of *diarrhœa.* Both Dr. Christison and M. Rayer have noticed the frequency of this complication; it having occurred in more than one half of their cases; but Dr. Bright and Dr. Prout have observed it less frequently. It is observed chiefly in the chronic disease, and is sometimes preceded or attended by colicky pains in the abdomen, and occasionally by vomiting; but, in this latter case, there is often also pericarditis complicating the malady. The diarrhœa is generally consequent upon the renal disease, and it sometimes assumes a dysenteric character; the stools containing blood, and more rarely a flocculent whitish matter. However abundant or watery the discharges, they have no influence in diminishing the attendant dropsy, which may even increase during the diarrhœa. After death, the intestines do not always present lesions co-ordinate with the amount of disorder during life. In many cases, little or no redness of the mucous surface is observed. In others, redness of this surface, with enlargement of the follicles, with or without ulcerations, and often with anæmia of other parts, is remarked. Frequently, although the diarrhœa has been great and obstinate during life, the mucous membrane, and, indeed, the intestinal canal, have been anæmic throughout. Ulcerations are most common near the termination of the ileum and in the large intestines. In the former situa-

tion they are generally confluent; in the latter, disseminated and small.

116. *d. Peritonitis* in rare instances occurs consecutively upon cachectic nephritis. Cases of this complication are recorded by Dr. BRIGHT, Dr. GREGORY, Dr. CHRISTISON, M. RAYER, and others. In some instances the peritonitis is granular or tubercular; in others, it is attended by considerable effusion of a sero-puriform fluid. The peritonitis may be consequent upon enteritis, with or without ulceration (see article INTESTINES); or it may arise without the intestinal disease having been manifest. It is generally caused by the influence of cold and humidity during the existence of the renal dropsy, and is often not the only affection complicating this latter; both pleuritis and pericarditis, either singly or conjoined, being also present. In these cases, the symptoms of peritonitis are more or less manifest, generally with vomiting, diarrhœa, &c.; but as frequently they are by no means decisive.

117. *e. Lesions of the liver* are often found in connection with cachectic nephritis; but, in many cases, the lesion is slight. Dr. BRIGHT found the liver quite sound in 40 cases out of 100; the change was slight in 35, and serious in 18 cases. M. RAYER states that this organ was more or less altered in about a third of the cases which he examined after death, in some throughout its whole extent, in others only in parts. It was enlarged in a small proportion of instances (one sixth), and chiefly in those cases where the heart was also diseased. Occasionally some portion of its peritoneal surface was adherent to adjoining parts. It was softer than natural in a few instances, but it was much oftener harder, or even indurated and diminished in bulk. In this latter case its surface was irregular, of a deeper colour than usual. When divided, its substance was found tuberculated, presenting the lesion which has been denominated *cirrhosis*, or the tubercular liver of drunkards. This particular lesion seems to be more frequently associated with granular kidney than any other alteration of the liver. In some cases the liver is enlarged, pale, and fat; a portion of its structure leaving an oily stain in paper. In a few instances, it contains large whitish tubercular masses. The bile is generally more or less changed from the healthy state. It is probable that the advanced stages of these lesions are consequences of the renal malady; but it is at least equally probable, that their early stages, or the functional disorders preceding them, exist antecedently to the development of this malady. The nephritic disease and the attendant dropsy are not infrequently further associated with affections of the lungs, or of the heart, or of the alimentary canal, or with chronic peritonitis. The complication with hepatic disease is often rendered manifest by the usual symptoms of chronic affections of the liver, and attended by vomiting, diarrhœa, and ascites.

118. *f.* The *Spleen* and *Pancreas* are sometimes diseased in cachectic nephritis. In all the cases in which the liver is affected, the spleen is also more or less altered, most frequently enlarged, and occasionally its substance is loaded with greyish granulations analogous to those found in the liver. (RAYER.) The structure of this organ is sometimes softened, occasionally firm or indurated. The *pancreas* has been found diseased only in a few instances, and in a slight degree. The disease has in a few instances appeared in the course of *pregnancy*, and M. RAYER details some cases thus associated.

119. As far as I have been able to observe the phenomena of the early stage of cachetic nephritis, and to learn the history of the patient's previous ailments, there has been more or less manifest disorder of the digestive organs, generally of a functional kind, but probably advancing to structural change in some cases, as the disease made progress. The influence of such disorder upon the state of the blood, and upon the processes of secretion and excretion, is sufficiently evident. In all these cases, and before dropsical effusion or vascular reaction had taken place, depression of the organic nervous energy, and consequent impairment of the functions of digestion, sanguifaction, and assimilation, were more or less remarkable. The vascular excitement, which sometimes appears at an early period of the disease, is the consequence, as I have already shown, of the morbid state of the blood; and of its influence upon the ganglial and vascular systems.

120. *B. Relations of Cachectic Nephritis to Diseases of the Respiratory Organs.* — *a.* Inflammation of the *throat*, extending to the *pharynx* and *larynx*, occurring in the course of scarlatina, sometimes is continued, with more or less severity, during the progress of the renal dropsy following this fever; and when the larynx becomes affected, the disease of this part may be so remarkably severe as to be speedily fatal. This form of complication, however, is not so frequent as inflammation and ulceration of the larynx, trachea, and even of the larger bronchi, which so frequently occur in the course of phthisis, the pulmonary malady giving rise not only to the affection of the respiratory passages, but also to renal disease and its consequent anasarca. In two cases, in which there existed a venereal taint, the progress of which I closely watched, and where it was difficult to decide whether the laryngeal or the pulmonary disease was the primary one, renal dropsy appeared at early periods of their progress, advanced remarkably far, and accelerated the fatal issue.

121. *b. Bronchitis* is one of the most frequent affections *consequent* upon renal disease. M. RAYER states that he has observed it in seven eighths of the chronic form of this malady. The bronchitis that occurs is rarely acute; it is almost always chronic; and, whilst the respiration is very slightly affected in some cases, it is much accelerated, and very difficult in others, particularly at an advanced period of this malady. The matter expectorated is chiefly mucus, occasionally thick and yellowish, in some instances glairy, and in others very abundant. The bronchitis generally aggravates the disease, and is sometimes the more immediate cause of death. It frequently occurs without any manifest cause; is rapidly propagated throughout the bronchi; is little influenced by treatment, or ameliorated by depletions; and often passes into oppletion of the minute ramifications and air-cells and extensive œdema of the lungs. Its more acute form is sometimes followed by lobular pneumonia. On dissection, the mucous membrane of the bronchi is found red throughout.

122. *c. Pneumonia* sometimes occurs as a *secondary* complication in the advanced stage of cachectic nephritis, and is more or less extensive and severe.

The inflammation attacks sometimes several lobes, sometimes only the whole or part of a lobe, and occasionally it affects many lobules of the lungs. In this latter case, the inflamed points are disseminated and isolated in the substance of the organ, some of them being in the state of red hepatization, others of grey hepatization, and closely resembling the lobular form of pneumonia, which occurs after morbid poisons, and sometimes after surgical operations. One or both lungs may be affected, more frequently both. The symptoms and signs of this pneumonia are usually masked by the general cachexia, by the dropsical effusion, by affections of the heart, and by other pulmonary lesions. Even the stethoscopic signs are ascertained with great difficulty, or altogether absent. The expectoration also is seldom characteristic of the disease, being more frequently catarrhal or bronchitic, than of the kind distinctive of pneumonia. Hence the inflammation is either latent, or not detected during life. In some cases, however, the sputa and the stethoscopic signs evince the existence of the disease. This complication is most dangerous, owing to the state of the constitution, and to the inefficacy or even injurious effects of bloodletting, and of many other means of treatment. It is often associated with pleuritis, or with bronchitis, or even with both, when it occurs consecutively upon renal disease.

123. *d. Pleuritis* is rare as a secondary disease in its simple form in connection with cachectic pleuritis, but associated with pneumonia, or with pulmonary tubercles, and with serous effusion in the pleuritic cavities, or with pericarditis, it is by no means unfrequent. It is generally latent or overlooked, or masked by dyspnœa or by bronchitis. It is sometimes chronic and occasionally acute and manifest. In some of the more chronic, masked, or latent cases, the disease assumes much of the character of hydrothorax, owing to the amount of fluid effused, and the slight grade of inflammatory action.

124. *e. Œdema of the Lungs*, with or without bronchitis or bronchorrhœa, is the next frequent secondary affection to bronchitis which occurs in the course of albuminous nephritis. Dr. BRIGHT and M. RAYER found this lesion in about one third of the fatal cases. *Emphysema* of the lungs occasionally occurs, and *pulmonary apoplexy* more rarely, in the progress of the renal malady.

125. *f. Tubercular consumption* is very frequently connected with cachectic nephritis, but the connection is most commonly of a different kind from that usually observed in the other pulmonary affections with which this malady often becomes complicated in its course; the renal disease is almost always *consequent upon* the tubercular malady. M. RAYER believes that, in rare instances, the latter may be secondary of the former; but, although I have seen very many cases, since 1828, of renal dropsy supervening in the course of phthisis, I have never met with one in which this order was reversed. The renal malady may appear during any period of the tubercular disease, and in every form of it; in the most acute and febrile, and in the most chronic and apyretic. Generally the urine becomes more or less albuminous before any signs of anasarca appear. In a few cases the urine has been albuminous, and less dense than natural, in the advanced state of phthisis, and the kidneys have been found granular after death, and yet anasarca had not occurred. This may have arisen from the continuance of the colliquative perspirations, as these often cease upon the occurrence of the anasarca. Diarrhœa frequently continues during the renal disease, without diminishing the dropsical effusion. Bronchitis, pneumonia, pleuritis, laryngitis, pneumo-thorax, pleuritic effusion, or œdema of the lungs, or even two or more of these, may further complicate the tubercular malady and its consecutive renal disease.

126. *C. Relations of Cachectic Nephritis to Diseases of the Vascular System.* — *a. Diseases of the Heart* are often associated with cachectic nephritis, but the connection between them is not altogether evident. In some cases the cardiac, in others the renal, disease seems to be *primary*. The frequency of this complication also is not fully ascertained. M. RAYER states, that it occurred in one fifth only of his cases, whilst Dr. BRIGHT found it in sixty-five cases out of a hundred. The cardiac affection may appear, in some instances, as the primary, in others as the consecutive, and in others as an accidental malady; and yet both it and the renal disease may only be the more or less remote effects of previous changes in the states of organic nervous power, and of the circulating fluids, either of which may precede the other in the order of succession or sensible manifestation, in different cases, or in different circumstances. This view of the subject, which is equally applicable to some other complications of this malady, has been unaccountably overlooked by those who, in most respects, have written well on the disease, and contributed greatly to its history and elucidation. The occurrence of this complication has great influence upon the production and increase of the dropsy generally consequent upon the renal malady, and usually causes the anasarca to commence in the lower extremities. Dr. BRIGHT and Dr. CHRISTISON think that the cardiac disease is most frequently secondary, whilst M. RAYER believes that the kidneys are oftenest consecutively affected; and I consider that interrupted circulation through the heart and lungs favours remarkably the occurrence of the chronic states of this malady. That the urine is often albuminous in persons affected with disease of the heart, when there is no serious affection of the kidneys, cannot be denied; but if, along with this character, it is of a pale citrine colour, strongly coagulable, and of a low specific gravity, these are strong proofs of the presence of structural disease of the kidneys.

127. *b.* The *pericardium* often contains a small quantity of limpid serum, from four to five ounces, in fatal cases of cachectic nephritis; but rarely so much as to constitute true pericarditis. Lesions of the pericardium may be either antecedent to, or consequent upon those of the kidneys. The relative dates of these lesions may be often inferred from the history of the case, in connection with their appearances upon dissection. There can be no doubt that, when the heart or its valves are diseased, the pericardium becomes more liable to inflammation, or to be the seat of effusion; and that this liability, more especially to inflammatory action, is much increased by the renal disease and the morbid state of the blood. Hence old lesions of the pericardium, or recent changes in it, or even both, will occasionally be found after renal dropsy, although they may be detected with difficulty

during life, whether they be associated with other cardiac lesions or not. The remarks I offered above (§ 126), respecting the complication with cardiac disease, apply here: the pericardiac lesion may be either primary or secondary in appearance, and yet both it and the renal malady may be only the consecutive effects of anterior disorder, some exciting or concurring cause, as cold and humidity developing these two diseases as effects of this disorder, which may not have been manifested, especially in these organs, if such exciting or determining cause had not been in operation.

128. *c. Endocarditis* is also sometimes associated with cachectic nephritis, and is most probably consequent upon the morbid state of the blood, in the advanced stage of the latter malady. It may be present either simply or complicated with pericarditis or other lesions of the heart. M. RAYER thinks it not always possible to say which of the two affections is primary or secondary. He believes them, in a very few cases, to be almost coëtaneous; but, in a much greater number, he considers the endocarditis to have preceded the renal malady. I think that the order of morbid procession is different from this in most instances.

129. *d.* Various *lesions of the heart, of its valves,* and *of its orifices,* are found in connection with albuminous nephritis; and these morbid states may be further associated with alterations of the serous surfaces of the organ, or with disease in some other important viscus, as the lungs, the bronchi, &c. Amongst these, lesions, hypertrophy, dilatation, &c., of some one of the chambers, dilatation of the orifices, insufficiency of the valves of the heart, &c., are not uncommon; but it is unnecessary to specify the various combinations of disease which present themselves in this class of cases, as they vary much in different instances. These lesions favour the supervention of the renal malady by causing congestion of the kidneys.

130. *e.* The *blood-vessels* sometimes present alterations of structure in cachectic nephritis, consisting chiefly of atheromatous and ossific deposits, with or without dilatations, and varicose states of the veins; more rarely of aneurismal dilatations, and of the consequences of inflammation. Dr. BRIGHT and M. RAYER have found evidence of pre-existent inflammation of the renal veins; and have remarked, that the arterial ramifications through the granular kidney were not so easily penetrated by an injection as those of a sound kidney.

131. iv. *Relations of Cachectic Nephritis to Cerebral Affections.* — Cerebral affections sometimes occur in the course of the renal malady, and chiefly in its far advanced stage, and in its more acute form. These affections consist of comatose, apoplectic, or convulsive seizures, and of more or less sudden death, with insensibility. In many of these cases there is little or no appreciable lesion of the brain; but more frequently there is effusion of serum within the ventricles and under the arachnoid. All these affections are consequences of the renal malady, or rather of that change of the blood which is connected with, and augmented by, the renal disease. In a few instances, *lethargy* or *coma* precedes death for a considerable period, from which the patient may be partially roused, but in which he immediately afterwards falls, the comatose state becoming gradually more profound, and passing into apoplexy, with stertorous breathing, or into convulsions, or into a mixed state of apoplexy and convulsions. The serum within the ventricles or under the arachnoid, in these cases, has been found by Dr. BARLOW to contain urea. Extravasation of blood in various situations within the cranium, as in the substance of the brain, in the ventricles, or between the membranes, — or true apoplexy, in the course of cachectic nephritis, — has been observed by Dr. BRIGHT, Dr. CHRISTISON, and M. RAYER, but this, probably, was only an accidental complication: it is of rare occurrence.

132. *D. Relations of Cachectic Nephritis to Diseases of the Skin and Cellular Tissue.* — *Chronic eruptions* on the skin, indolent and gangrenous *sores* and *ulcers* of the extremities, *erythema,* and *erysipelas,* are sometimes associated with the renal malady. When they appear during the distension occasioned by the dropsical effusion, both their occurrence and the unfavourable form they are apt to assume chiefly arise from this circumstance. But in earlier periods of the disease they proceed in a great measure from the existing cachectic state of the constitution and the change in the blood, disposing any injury or irritation of the skin to pass into inflammation, which, owing to these states, often assumes an asthenic or spreading character. This form of complication is not infrequently further complicated with disease of one or more of the abdominal and thoracic viscera.

133. *E. Relations of Cachectic Nephritis to Eruptive and other Fevers.*—The appearance of this disease, in connection with these fevers, has been almost confined to *scarlatina.* A case, however, has been published by Dr. GREGORY, in which it was consequent upon measles in a scrofulous girl. The occurrence of dropsy, with scanty, bloody, or coagulable urine, subsequently to scarlatina, especially to the less severe forms of that disease, and in some epidemics more frequently than in others, has long engaged the attention of medical writers. CALVO, BORSIERI, STÖRCK, PLENCIZ, ROSENSTEIN, WELLS, BLACKALL, and REIL, have noticed the state of the urine, and the peculiar character of the dropsy, after scarlet fever, but have not connected the disease with inflammation or other lesion of the kidneys; and, until very recently, the dependence of this form of dropsy chiefly upon an inflammatory state of the kidneys was not ascertained or even suspected. Dr. FISCHER, in a *Memoir on the Treatment of Scarlatina,* published in HUFELAND'S and OZANN'S *Journal* (*Feb.* 1824, st. 53.), remarks that the kidneys are often severely affected in the latter stages of scarlatina, — that they are in a state of congestion, which is readily converted into inflammation by diuretics, and especially by those which are stimulating and acid. He adds, that he long considered the vomiting, which frequently attends the accession of dropsy consecutively upon scarlet fever, to be caused by disease of the brain; but further observation and careful dissections proved to him, that it was symptomatic of disease of the kidneys. He subsequently endeavoured to ascertain the symptoms which marked this affection of the kidneys at its commencement, and he found them in the urine, which became more scanty, of a deeper colour, sometimes tinged with blood, or even containing pure blood, when the vomiting appeared. Mr. HAMILTON details a case in his account of an epidemic scarlatina, &c.

(*Ed. Med. and Surg. Journ.* vol. xxxix. p. 145.), in which the same appearances as are described under the first form of lesion (§ 100.) of the kidneys were found in a patient who died from this consecutive disease. Respecting this connection of renal dropsy with scarlatina, M. Rayer remarks—

134. 1st. That in certain cases of scarlet fever, particularly during the period of desquamation, the urine is more or less loaded with albumen, without dropsy occurring; at the same time the kidneys are congested with blood, or present lesions corresponding with those belonging to the first form, which is commonly produced by cold and humidity, or by the abuse of spirituous liquors. 2d. That the dropsy sometimes observed after scarlatina, in its course, and as respects its exciting or determining cause (cold and humidity); in its general characters, and the alteration of the urine attending it; in its abdominal, thoracic, and cerebral complications; in the structural lesions observed after it; and as to its nature and treatment,—differs in no respect from the acute and chronic albuminous nephritis produced by other causes, and appearing under other circumstances. These inferences are fully supported by my own experience, and by the evidence recorded by Bright, Wood, Stark, Alison, Graves, Seymour, Guersent, Rayer, and others.

135. When cachectic nephritis takes place after scarlatina, it commences about the close of the third, or beginning of the fourth, week from the appearance of the eruption. The patient, although he may have been previously recovered, becomes uneasy and somewhat feverish. His sleep is disturbed, his appetite is impaired, and sometimes nausea and vomiting are present. A few days afterwards a puffiness is noticed about the eyelids, gradually extending to the face and neck, and thence to the extremities and trunk. The countenance at the same time becomes pale and cachectic. Sometimes the œdema appears suddenly, and almost simultaneously, over the whole surface of the body. The urine is commonly much diminished in quantity, and voided frequently and with difficulty. It is of a deep reddish brown, and often contains a portion of blood mixed with it. Generally a flocculent whitish matter may be seen suspended in it, resembling unclarified whey, or, when there is any admixture of blood in the urine, like the water in which raw meat has been washed. Its specific gravity is more or less below the healthy standard. The action of the heart is frequently strong or tumultuous: the skin is hot, and the breathing is quickened and oppressed. In some cases the head, in others the chest, and in others the abdomen, is the chief seat of suffering. Such usually is the *acute form* of the disease as occurring consecutively upon scarlatina; but it has occasionally appeared more suddenly, particularly when the patient has been exposed, at or soon after the period of desquamation, to cold and humidity, and it has then, in a few cases, terminated fatally in forty-eight hours after its appearance, from the supervention of coma, or convulsions, or asphyxia. In the *chronic state* consequent upon scarlatina, there is commonly little or no fever, and the action of the heart is much less exerted. The symptoms are less severe and more gradual in their appearance and progress. The urine is less deeply coloured, but always albuminous, and of lower density than natural.

136. In the *acute form* of the disease consequent upon scarlatina, vomiting, dilatation of the pupils, slowness and irregularity of the pulse, stupor, coma, paralysis, convulsions, &c., sometimes appear and indicate a most dangerous affection of the brain, often with serous effusion within the ventricles, or under the arachnoid. Pulmonary complications are very common in the acute cachectic nephritis following scarlatina. These are either inflammation of the bronchi, or of the lungs, or of the pleura; or serous effusion in the cavities of the pleura or in the pericardium, or œdema of the lungs; these effusions being consequent upon an inflammatory or congested state of these parts, the vessels, owing to the cachectic condition of the constitution, and to the states of vital power and of the blood, being incapable of throwing out coagulable lymph, but allowing a liberal discharge of serum. These inflammatory complications were frequently observed in the epidemic scarlatina which occurred in Florence in 1717; and Borsieri remarks, that the Florentine physicians, "Mortuorum cadavera secuerint, inveneruntque pulmones, pleuram, intercostales musculos, diaphragma, *renes*, et intestina plus minusque inflammatione correpta." Cachectic inflammation of the kidneys may occur after scarlatina, the urine being albuminous, and yet no anasarca may take place. Generally in these cases there is either a very scanty secretion or an entire suppression of urine, and the patient is more or less suddenly carried off by internal congestion, or inflammation, or serous effusion; stupor, coma, paralysis, convulsions, or asphyxia, ushering in dissolution. The occurrence of this form of nephritis after other *fevers*, as typhoid, remittent, and intermittent fevers, has not hitherto been observed.

137. *F. Relations of Cachectic Nephritis to Scrofula.* — Most of the instances of this disease that I have observed have been in children and adults of the scrofulous diathesis; and the experience of Bright, Gregory, Christison, Hamilton, and Rayer is to the same effect. Strumous children who are insufficiently clothed and fed, and exposed to cold and humidity, are liable to be affected with this malady; and some of them possessed of this constitution become the subjects of this form of nephritis without being exposed to these exciting causes; and indeed all the patients who are attacked with it, independently of these causes or of intemperance, more especially those who are young, present more or less decided evidence of a scrofulous taint, which acts, as shown hereafter (§§ 148. 152.), both as a predisposing and as an exciting cause. In many of these cases, evidence of anterior scrofulous disease is manifest, whilst in others scrofulous abscesses or diseases of the bones coexist with chronic cachectic nephritis.

138. *G. The connection of this malady with the syphilitic taint* has been pointed out by M. Rayer; and it may be doubted whether or no this connection is owing to a syphilitic cachexia or to the means which had been employed to cure it, as a liberal or excessive use of mercury. Wells and Blackall ascribed the appearance of dropsy with coagulable urine, in such cases, to this particular cause. In two cases, both professional but not medical men, this form of nephritis occurred during

an advanced stage of their maladies. They both had had severe secondary syphilitic symptoms, for which mercury had been employed, and soon afterwards tubercular consumption manifested itself. During the treatment of this latter, the usual signs of cachectic nephritis appeared, and hastened death much sooner than it probably might otherwise have taken place. A similar instance is recorded by M. RAYER.

139. *H. The connection of cachectic nephritis with rheumatism* has been insisted upon by Dr. CHRISTISON, who remarks that, in every instance of obstinate chronic rheumatism that comes under his care, he examines the state of the urine as to its coagulability and density. The rheumatic affection which is sometimes thus connected, is commonly of the neuralgic kind, and precedes, rather than attends, the dropsical affection. This complication occurs chiefly in those who have been habitually exposed to cold and humidity. The connection of this form of nephritis with *gout* is comparatively rare.

140. iv. NATURE OF CACHECTIC OR ALBUMINOUS NEPHRITIS. — From what I have already stated with reference to the *causes*, and the *associations* or complications of this malady, views as to its nature, and more especially the one entertained by the author, may be readily understood. Hitherto, it has not been sufficiently considered as a merely secondary disease, all the phenomena in any way connected with it being considered rather as signs and symptoms of its pre-existence, in some one or other of the forms of lesion described above (§ 100 *et seq.*), than as concomitant changes, many of which depend more upon antecedent disorder than upon the associated or otherwise related affection of the kidneys. The questions, therefore, are — 1st. In what does this primary disorder consist? 2d. In what manner does the renal malady arise consecutively upon it? and 3d. Wherefore is this consecutive disease so very generally associated with others, in some part of its course? What has already been advanced will render it unnecessary to enter upon lengthened details in answering these questions.

141. 1st. The several circumstances connected with the origin of the malady — the predisposing and the concurring and exciting causes — the existence and the character of antecedent disorder affecting either the general constitution or the functions of some vital organ, — all combine in evincing that the earlier morbid states are impaired organic nervous power, and, consequently, insufficient sanguification and assimilation, with disordered secreting and excreting functions. It will necessarily follow, even from an early stage or from a slight grade of these morbid conditions, that the blood will be more or less affected, and that a change in the blood will, according to the nature of such change, affect also other organs.

142. 2d. It is difficult to state with any degree of precision what are the changes which impaired organic nervous power, and consequently weak digestive and assimilative functions, will produce in the blood at early stages of their existence; but, in more prolonged periods of their influence, the results are frequently remarkable to the senses, although not so precisely determined by chemical or physical analysis. It is probable, from the results of observation and of analysis as partially employed, and from analogy, that the chyle is not fully elaborated in the first instance, and subsequently changed into healthy blood; that the serum contains more oily or fatty matter than natural, the result of insufficient assimilation; and that the several constituents of the blood, in relation to each other and to the system in which they circulate, are held together by a weaker vital affinity. During this state of the organic nervous power and of the circulating fluids, the excretory functions necessarily become impaired; and although those substances which are the ultimate results of assimilation may not be abundantly produced, certain of them, as urea, may be present in excess in the blood, owing to insufficient excretion, especially by the skin and kidneys. The resulting morbid condition of the blood will thus become an exciting cause of vascular disease of the kidneys progressively advancing to organic change; and, once these important eliminating organs are diseased, the blood will become more and more altered, and sanguification the more impeded or altogether arrested. In all cases, also, both kidneys will be affected, for as in other diseases, where the causes are constitutional, consisting of cachectic states, or of changes in the blood, double organs, or similarly constituted tissues, will experience similar or even identical changes.

143. 3d. The chief reasons for the appearance of cachectic nephritis in connection with other maladies are apparent in the very condition or circumstances of the constitution, and of the health, of persons in which it occurs. There is not only the pre-existing impairment of the digestive and assimilating powers just insisted upon, but there are also, in many cases, other antecedent maladies, which are always attended by weakness of these functions, as phthisis, scrofula, scarlet fever, &c., and which readily give rise, especially in certain states of predisposition, to the renal malady as a secondary or more remote effect. In these cases, the associated or related disease is primary, and favours the production of that state of the blood which affects the circulation, and ultimately the structure of the kidneys. Other complications are either associated results of the previous disorder, — are equally with the renal malady effects of the previous changes in the states of organic nervous energy, and of the blood, — or they are consequences of the disease of the kidneys, through the medium of the blood, a morbid state of this fluid being much increased by the affection of these organs; and being such as readily inflames or irritates parts which, from predisposition, former disease, or the influence of concurring causes, or prevailing influences, become more liable to those consecutive affections.

144. The *dropsy* so generally attending this malady arises from more than one of the pathological states constituting it. In the *acute* or early state of the disease, and especially when it is consequent upon scarlatina, the anasarca is chiefly owing to the weakened vital affinity subsisting between the constituents of the blood, and to the weakened tone of the extreme capillaries. Probably something is also owing to the suppressed functions of the skin: exhalation from the external surface of the integuments being interrupted, it becomes increased into the areolar tissue. The action of the kidneys is also impaired in most of the acute states of the disease; the watery parts of the blood become excessive; ex-

crementitial plethora is thus produced; and effusion takes place from the overloaded vessels. In the *chronic* and far advanced states of the disease, the dropsy is owing chiefly to the change in the blood itself — to its thin and impoverished condition, and to impairment of the vital affinity between its several constituents, and between it and the blood-vessels. That the dropsy is not owing to excess of serum, is shown by its co-existence with a free discharge of urine, and with diarrhœa, and with an anæmic state of the vascular system, in many instances. It may, however, be increased by the suppressed perspiratory functions of the skin.

145. v. Prognosis.—The very serious and dangerous nature of this disease may be inferred from what has already been stated respecting it. — *A.* In the *acute state*, death sometimes takes place suddenly, owing to the rapid development of disease in the brain, lungs, or pericardium. Hence the propriety of attending to the states of these organs as long as the urine continues to be albuminous or sanguinolent. This form of the disease is less dangerous when it occurs after scarlatina, or during the early stage of pregnancy, than in other circumstances. The nature of the chief *causes* should always be considered before a prognosis be given in any case: for when the malady proceeds chiefly from intemperance, the chance of associated visceral disease, although it may not be very manifest, and the danger, are always increased. The prolonged influence of cold humidity, and of low or damp residences, generally occasions a more dangerous malady than the temporary operation of these causes.

146. *B.* In the *chronic form*, the prognosis is still more unfavourable than in the acute,—a fatal issue may be more remote, but it is more certain ultimately. As long as the urine is coagulable, and of diminished density, the patient is in a most precarious state, from the tendency in these circumstances to dropsy, pleuritis, pericarditis, cerebral affections, and to various other maladies, which assume the most dangerous forms when associated with renal disease. Any marked diminution of the quantity of urine, when it is of morbid composition, should always be viewed with great suspicion, as often preceding the maladies now mentioned. A still more remarkable diminution of the quantity of urine, or its entire suppression, is generally a precursor of a cerebral attack and of a fatal issue. The more manifest also the cachectic state of the constitution, and the more important the affection complicating the renal malady, the more unfavourable does the prognosis necessarily become, and still more so when these two circumstances are conjoined in the same case.

147. An increase of the quantity of urine, relatively to the amount of fluid taken, coincidently with a diminution of the dropsy and of the albumen in the urine, is generally a favourable omen; but unfortunately it is not rare to see this change arrested suddenly in the course of a few days, and followed by an increase of all the symptoms. A return of the specific gravity of the urine to the natural state, owing to an increase of the urea and salts naturally existing in it, coincidently with a marked diminution of the albumen, is a very favourable circumstance; but it is very rarely observed in the chronic form of the disease. The diminished density, on the other hand, of the urine is an unfavourable circumstance, more particularly if the quantity voided be not augmented. Upon the whole the prognosis in this form of the disease should depend upon the number and nature of the primary concomitant or consecutive affections complicating it, rather than upon its duration and history. Of these affections some are acute, as cerebral attacks, pneumonia, pericarditis, &c., and speedily fatal; others are chronic, as scrofula, tubercular consumption, organic lesions of the stomach, or of the liver, or of the heart, the syphilitic cachexia, &c., and place the patient in equal, although not in so immediate, danger.

148. vi. Remote Causes. — *A.* The *predisposing causes* of cachectic nephritis are whatever depresses vital power, and tends to render the system cachectic. The scrofulous diathesis and a syphilitic taint, the former especially, favour the operation of the more direct or exciting causes. This disease rarely attacks infants, or very aged persons; but it is frequent in children, in the acute form, chiefly as a sequela of scarlatina, and occasionally in the chronic form in children of the scrofulous diathesis, both primarily and consecutively upon scarlatina, and upon febrile or other disorders. It is most prevalent in cold and humid countries, and in places where spirituous liquors are most indulged in. It occurs more frequently in males than in females, probably in consequence of the former being more exposed to its exciting causes; and it is most prevalent between the ages of 20 and 50. My own observation fully confirms the following statement of Dr. Christison. In the greater proportion of cases, he observes, —in almost all those of a chronic nature, as well as in a few of the acute, the disease appears to be formed gradually, without any obvious exciting cause, under the influence of some depraved state of the constitution. And even in many of the acute cases, arising apparently in decided exposure to cold, the malady has silently originated in some constitutional cause at an earlier period, recent exposure having merely superadded some acute secondary affection, or given an acute character to pre-existing essential symptoms. It is clear, too, from the character of the disease in the generality of instances, as well as from the very peculiar nature of the morbid deposition in all, that there must always co-exist some constitutional infirmity, or otherwise some essential predisposing cause. This circumstance, however, does not exclude from the disease the constitutions of the robust and athletic. Dr. Christison has several times witnessed it in persons of robust habit and powerful frame: and M. Solon makes the same remark as to his experience. But a robust frame is not incompatible with infirmity of constitution in respect of morbid predisposition, as is familiarly exemplified by phthisis.

149. In this country, that state of constitution which results from habits of intemperance is the most influential in predisposing to the disease. Dr. Christison remarks, that from three fourths to four fifths of the cases he has met with in Edinburgh have been in persons who were habitual drunkards; or who, without deserving this appellation, are in the constant practice of using ardent spirits several times in the course of

the day, and of occasionally indulging to intoxication. In these persons, this habit is both a predisposing and an exciting cause — no other remote cause concurring to develope the morbid conditions constituting the disease. In most of the cases that thus originate, we find both tubercular liver and granulated kidneys, and the resemblance between both kinds of lesion is very close. In many, however, of the cases which appear thus to originate, it will be found upon a strict examination — upon inquiring into their previous states of health, their hereditary predispositions, their apparent diathesis, and the evidences of either external or internal pre-existent affections — that they present more or less conclusive proofs of the scrofulous constitution; habits of intemperance, and various other concurring or exciting causes, chiefly aiding this condition in originating the disease. The frequency of its occurrence in persons who have had enlarged or inflamed glands, or have presented other evidence of scrofulous or tubercular affections in early life, and in persons labouring under tubercular consumption, is an additional proof of the truth of this inference. Amongst this class of causes, intemperance in sexual indulgence and manustupration may be added.

150. Previous disease of the digestive, assimilating, and circulating organs of the stomach, liver, lungs, and heart, — tubercular formations, and continued and eruptive fevers, more especially *scarlatina*, — favour more or less the occurrence of this malady. In many instances, scarlet fever both predisposes to, and more directly occasions, it; no other causes but this being apparentley concerned in producing it.

151. *B. Exciting causes.* — *a.* Exposure to cold and humidity, or to either singly, and whatever has the effect of suddenly checking perspiration, as drinking cold fluids when the skin is perspiring, are the most frequent causes of the *acute* state of the disease; which most frequently occurs in persons who are most exposed, by occupation, to those causes and to vicissitudes of temperature, or who live in cold and damp cellars or localities. These causes also often co-operate with others, not only in originating the malady, but also in producing relapses or exacerbations. They frequently, even in their slighter grades, are more or less influential in developing the disease after scarlatina, especially during or soon after the period of desquamation.

152. *b.* The *chronic* form of the disease is generally occasioned either by intemperance, or by the prolonged influence of cold, humidity, and low damp residences, or by both classes of causes. M. RAYER considers cold and damp the most frequent cause of the disease in France. Poor, innutritious, or unwholesome food, physical misery and destitution, are also influential in producing it. The inordinate or liberal use of mercury was considered by Dr. WELLS and Dr. BLACKALL to be occasionally productive of albuminous urine; but Dr. RAYER has met with no proof of this effect of mercury. He states that pregnancy seems to give rise to an albuminous state of the urine. I have seen two instances of this change in the urine in pregnant females, but had no opportunity of ascertaining the results in these cases. The *pre-existing diseases* which seem to be most influential in exciting, as well as in predisposing to, cachectic nephritis, are scrofula, scarlatina, disorder of the functions of digestion and assimilation, diseases of the lungs, of the heart, and of the liver, and the syphilitic taint. It appears in the advanced course of tubercular consumption in a very large proportion of cases, and is always the consecutive affection, as remarked by M. SOLON and Dr. CHRISTISON; but this connection of the disease is more fully insisted upon above (§ 125.).

153. vii. TREATMENT.—The treatment of this disease should depend much upon the *form* it assumes, upon its *stage* or *duration*, upon the *causes* which have induced it, and upon the *complications* it presents. — *A.* In the *acute form* and early *stage* of the disease, the treatment should be decidedly antiphlogistic; but yet with strict reference to the predisposing and exciting causes. — *a. Blood-letting*, general or local, is always necessary, especially at the commencement of the disease; and it should be carried to an amount which the circumstances of the patient, and the degree of febrile action, will suggest. In the majority of cases, *cupping* on the loins is the most appropriate method of vascular depletion; but, in the most acute states, and in more robust persons, a general blood-letting should be premised: and, in these, cupping on the loins may be even repeated in some instances. In children, after scarlatina, cupping should be the chief or only mode of depletion.

154. When the anasarca is great, *venæsection* should be practised with caution, as respects this operation itself; for, although there is a necessity for blood-letting, there is a great tendency to inflammation of the vein, if the incision be imperfectly closed, or exposed to the air. It is chiefly in the febrile, acute, and early stage of the disease, that vascular depletion can be employed with advantage, and especially when the disease is caused by exposure to cold and humidity. When *acute* or *subacute* symptoms appear in the course of the chronic form of the malady, even local depletions should be practised with caution; the previous and present states of the disease, the complications, and the constitutional and vascular conditions, being the only guides by which the practice ought to be directed. In most cases, cupping is a preferable mode of depletion to the application of leeches, inasmuch as the quantity and state of the blood drawn are more accurately ascertained by the former, and erysipelas is less likely to follow it, than the latter.

155. *b.* In the acute and early stage of the malady the warm or vapour *bath* may be employed, and be aided by warm bed-clothes, so as to promote the cutaneous transpiration. *Diaphoretics* may also be prescribed; and their operation may be assisted by warm diluents, demulcents, &c., containing small quantities of nitre, or the spirits of nitric ether. If the patient leave his bed, especially if the season be cold, the clothing should be warm, and he ought to wear flannel from head to foot, and avoid currents of cold air and stimulant beverages.

156. *c. Purgatives* are always requisite, and the more so when the dropsical effusion is great. They ought to be exhibited at the commencement of the treatment, and instantly after the first blood-letting. The selection of purgatives should be guided by the complications, by the form and

amount of the dropsy, and by the state of the urine. The compound jalap powder, elaterium, gamboge, the more common purgative pills (see *Appendix*), the saline aperients, &c., may be prescribed according to circumstances, and to the states of the stomach and bowels. When *vomiting*, or much irritability of stomach, is present, blood-letting, as just advised, will often allay this symptom, and prepare for the exhibition of purgatives, which may be conjoined with colchicum; but if this symptom continue, creasote or the hydrocyanic acid will generally allay it. Dr. Prout remarks that, when the more active symptoms have subsided, the purgatives may be associated with diuretics: or the diuretics may be given alone, as the case may indicate. Of diuretics, the nitrate, tartrate, or super-tartrate of potash, conjoined with nitre and the spiritus ætheris nitrici, are amongst the best, and may constitute a part, at least, of the prescription. Blisters are doubtful remedies; though, if not kept applied too long, they may be sometimes useful. But strong mustard poultices, or other irritants, producing speedy and decided effects, are preferable. When *diarrhœa* accompanies this state or stage of the disease, warm baths, small doses of opium, or of Dover's powder, and leeches applied to the perinæum or anus, are the most beneficial remedies.

157. When the urine has assumed its usual quantity and properties, we may conclude that the acute state has subsided; though the urine will be found to contain more or less serum for a considerable time subsequent to the attack, particularly after meals. In the latter stages, purgatives must be given with caution; but diuretics are occasionally required to the last; and warm baths are often of service, particularly when they are used by the bed-side of the patient, and shortly before the hour of repose. If, after a week or two, the quantity of albumen in the urine again become increased, and if other signs of a *recrudescence* of the renal disease be present, cupping on the loins should be repeated, and this may be followed by the application of external irritants, and these by emollient cataplasms in the same situation. During the acute stage of the disease, the *diet* and *regimen* should be antiphlogistic. M Rayer states that he has found a milk diet, continued for some days after the subsidence of the acute symptoms, of great service.

158. *B. Treatment of the Chronic Form.*—Whilst the treatment of the acute disease is simple, that of the chronic is difficult and complex; and whilst it is often efficacious in the former, it is generally ineffectual in the latter. In the majority of cases, all that we can hope to effect is to arrest or suspend the morbid action; a complete cure is hardly within our reach. The treatment, nevertheless, should embrace the various considerations suggested by the states of the urine and kidneys, by the attendant dropsy, by the constitution of the patient, and by the antecedent disorder and present complications.

159. *a.* Whenever there is reason to suspect the existence of active congestion of the kidneys, either from a feverish state of the system or from local uneasiness, cupping on the loins may be resorted to; but we should be careful not to employ too large depletions, more especially when the renal malady has been prolonged and is far advanced, or structural lesion very serious. Great mischief will be done by lowering the powers of life in these circumstances, and the local change will be increased rather than diminished by the depletion. Unless at a very early stage of the chronic malady, the morbid state of the blood, and even its deficiency, forbid the abstraction of it unless in small or moderate quantity, when the supervention of acute or sub-acute symptoms, or of inflammatory attacks of other organs, as of the pleura or lungs, demands a recourse to this measure; for the occurrence of these attacks during the course of the renal disease is the consequence of the attendant state of the blood chiefly, and not of the lesion of the kidneys *per se*—a state of the blood which generally contra-indicates vascular depletion, although the nature of the complication may *seem* to require it. The circumstances which more especially should suggest great caution in prescribing even local depletion, are; debility and a manifest cachectic appearance consequent upon previous ill-health, or a chronic continuance of the renal disease. The co-existence of chronic incurable maladies, as tubercular phthisis, lesions of the heart and valves, particularly insufficiency of the valves, organic changes in the stomach, altogether contra-indicates a recourse to general or local blood-letting.

160. *b.* In the chronic as well as in the acute form of the malady, warm or vapour baths, flannel clothing next the skin, and the avoidance of cold, humidity, spirituous liquors and other exciting causes, are requisite. M. Rayer states that he has found setons, issues, and other exutories in the loins very advantageous; and that from four to twelve drops of the tincture of cantharides, given for a dose in some emulsion, have also been of service. I have given equal quantities of this tincture with the tincture of the sesqui-chloride of iron, with marked benefit, in a few instances. Iodurretted and mercurial ointments have been prescribed to the loins without any service; and the balsams have been taken internally with little or no advantage.

161. *c.* In the more advanced states of the disease, the preparations of *iron*, judiciously chosen, and combined with other medicines, are often more or less beneficial. I have seen more advantage derived from them than from any other class of medicines. The circumstances of particular cases can alone suggest those preparations which should be selected. When the dropsical effusion indicates a recourse to hydrogogue cathartics or to diuretics, some preparation of iron should be added, particularly when debility or cachexia is very manifest.

162. *d.* Of all *diuretics*, M. Rayer prefers a decoction of the *wild horse-radish*. It may be made a vehicle for other medicines. He agrees, however, with Dr. Bright in having little confidence in the most of diuretic remedies, and thinks that Dr. Christison has over-rated their value. In this disease, many substances disorder the stomach, thereby further impair digestion and assimilation, and accelerate its unfavourable progress. Many diaphoretics, particularly when given in full doses, have this effect, as Dover's and James's powders. The decoction or tincture of *guaiacum* is the best of this class of medicines, especially when the skin is cool as well as dry. Diaphoretics, diuretics, and purgatives or aperients, when clearly indicated, should be selected and conjoined with strict reference to the states of the digestive organs, of the

vital powers, and of the circulating fluids, as shown in preceding sections. It is chiefly owing to a neglect of such reference that an injudicious recourse to punctures of the skin has been had in this disease, in order to allow the escape of effused fluid. The states of the system just alluded to favour the occurrence of inflammation and consequent gangrene of the punctured parts. Dr. PROUT advises a recourse to a seton or issue in the region of the kidneys, and to the infusion of *diosma* with sarsaparilla. As a diaphoretic he prefers the citrate of ammonia, and as the disease proceeds the *pareira brava* or the *uva ursi*, combined with other medicines, according to the circumstances of the case.

163. *C. The Treatment of the Complications* of cachectic nephritis is always difficult and often hopeless. When they assume an acute form, they must be promptly met, and subdued or arrested within twenty-four hours from their appearance. If they are of a chronic kind, we can expect only to palliate the more urgent symptoms. — *Of the diseases which are associated with the renal malady*, it will be necessary to notice the treatment only of a few; for the means which are appropriate to the rest are either so manifest, or depend so entirely upon the circumstances of individual cases, that the physician will readily perceive them, and apply them accordingly.

164. *a. In Relation to Diseases of the Digestive Organs* (§ 114.), the treatment of cachectic nephritis requires the utmost attention to *diet* and *regimen*. The food should consist of articles which are the most readily assimilated, especially of the lighter kinds of animal food, and of milk boiled with farinaceous substances. The bitter tonics, sarsaparilla with liquor potassæ, or lime-water, or with BRANDISH's alkaline solution, and other restoratives, are especially necessary when the dyspeptic affection is attended by acidity and flatulence. In these as well as in other circumstances, the preparations of *iron*, but especially the *Mist. Ferri Composita*, are also beneficial, and should be taken for a considerable time. When irritability of stomach or *vomiting* is present, *creasote*, with or without opium, is a valuable medicine. When the bowels are also irritable, opium or morphia may be combined with the creasote with advantage; but, in other cases, the latter may be given with bitters and aromatics. *Hydrocyanic acid* may also be prescribed in similar combinations. If *diarrhœa* be present, opium, cretaceous mixtures or powders, lime-water, and aromatics, are requisite. In either of these affections, also, embrocations or fomentations may be applied over the epigastrium and abdomen, consisting chiefly of rubefacient and discutient substances, as the turpentine embrocation, &c. In the more obstinate cases of diarrhœa, the sulphate of zinc or of copper, or the nitrate of silver, or the acetate of lead, may be given with opium, &c. If *peritonitis* supervene, vascular depletion ought to be promptly prescribed; but with the knowledge, that in most states of the disease, and in the more advanced stages especially, the loss of blood is not attended by much advantage. This is particularly the case if the dropsical effusion is considerable, and leucophlegmasia or cachexia manifest. The peritonitis, in these circumstances, is most successfully combatted by fomentations with warm turpentine applied over the abdomen, and by opium with camphor taken internally. Lesions of the *liver* or *spleen*, even when recognised, are hardly influenced by medicine, when associated with this malady. The exact nature of the hepatic lesion frequently cannot be ascertained during life; and, even if correctly inferred, the most appropriate treatment is neither manifest nor generally beneficial. In these, as well as in other unfavourable complications, the chief indication is to support the powers of life by attention to diet, by residing in a dry and warm air, by taking gentle restoratives with alteratives, and by attending to the alvine excretions.

165. *b. The Associations of this Disease with Affections of the Respiratory Passages and Lungs* require the most cautious use of the remedies usually prescribed for either the former or the latter; and those which are most serviceable for the one are most injurious for the other.—*α. Bronchitis* is generally extended to both lungs; and, although it may be slight for a time, it may be suddenly aggravated so as speedily to terminate life. In most cases, the treatment advised for the more asthenic states of BRONCHITIS (§ 81. *et seq.*) should be prescribed.—*β. Pneumonia*, also, when it occurs, generally affects both lungs, and is often of the kind usually denominated asthenic or nervous. Unless in the earlier stages of the nephritic disease, and in the more robust subjects, vascular depletions are seldom beneficial in these complications. A free use of tartar-emetic, aided by external derivation, is much more deserving of confidence, especially in pneumonia, than depletions; but all means often fail in these cases. —*γ*. The same remarks are applicable to *pleuritis*, when it appears in the course of this malady. The disposition to effusion requires the prompt use of suitable means; but these means are not the same as are generally found serviceable in the early stages of common pleurisy. Blood-letting and mercury must be sparingly, cautiously, or not at all prescribed; whilst the repeated application of blisters, of the turpentine fomentation, &c., and a recourse to the hydriodate of potash internally, with other means suggested by circumstances, are most to be depended upon.—*δ*. When the nephritic malady arises in the course of *phthisis* (§ 125.), the latter is generally accelerated in its progress, whatever treatment may be adopted. As diarrhœa still continues to be more or less distressing, astringents, absorbents, and opiates are requisite, especially the sulphate of iron or of copper, with opium and creasote. The consecutive anasarca is commonly attended by a subsidence of the colliquative perspirations, and is sometimes diminished by a frequent recourse to the vapour-bath; but the benefit is never permanent. Indeed, no plan of treatment is found of lasting service in this complication. I have employed the *Mistura Ferri Composita*, or other preparations of iron, conjoined with other medicines suited to the circumstances of the case, in this complicated state of disease; and although in some instances benefit was manifestly derived from them for a time, an unfavourable issue ultimately occurred.

166. *c. The Associations of Cachectic Nephritis with Diseases of the Heart and Vascular System* (§ 126.) are no less hopeless than those with maladies of the lungs. The lesions of both the kidneys and the heart are reciprocally aggravated by association with each other. Even when re-

cognised during early periods of the complication, treatment has little influence in arresting or in impeding the progress of either. The means most influential in producing the latter effect are those which promote digestion, assimilation, and free excretion. To support the powers of life, and, at the same time, to procure the discharge, by the several emunctories, of unassimilated, effete, and injurious matters, are the chief intentions by which the treatment can be directed. These being recognised and guiding our practice, the choice of means should altogether depend upon the features of individual cases.

167. *d. The Association of this Disease with Cerebral Affections* (§ 131.) is chiefly contingent upon the acute state of the former, and are then owing to imperfect assimilation and excretion, and to consequent excrementitious plethora; congestion or serous effusion being thereby much more frequently produced than organic lesion of the brain itself. In those more acute states of this complication, cupping over the mastoid processes, or on the nape of the neck, blisters in these situations, active purging, stimulating embrocations on the loins, and the other means advised for the acute form of this malady (§ 153.), are to be chiefly resorted to. When cerebral affections occur in the advanced course of the chronic state of cachectic nephritis, they depend almost entirely upon exhausted vital power, in connection with vascular inanition; coma or lethargy being the most frequent forerunners of dissolution.

168. *e. Cachectic Nephritis consequent upon Scarlet Fever* (§ 133.) is the most favourable form of this malady; and when it assumes the *acute state*, the treatment should not materially differ from that advised above (§ 167.). General or local blood-letting, purgatives, vapour or warm baths, diaphoretics, diuretics, and warm demulcents, the warmth of bed, warm flannel clothing, and removal to a warm dry air, are the chief means of cure. If the disease be unattended by fever, if it become *chronic*, and the powers of life sink, stimulants and restoratives, particularly the tincture of the sesqui-chloride of iron, with the tincture of cantharides, warm medicated baths, embrocations, blisters, &c. over the loins, are then required. If complications appear in this state of the disease, they must be treated conformably with the principles already insisted upon; but this subject is more fully discussed in the article on Scarlet Fever.

169. *f. The Treatment of the other Associations of Cachectic Nephritis* mentioned above hardly requires further remark. When the disease is very obviously complicated with *scrofula*, and particularly with scrofulous abscesses or ulcerations, the Mistura Ferri Composita, liquor potassæ with small doses of the iodide of potassium, sarsaparilla, the iodide of iron, &c., and other restorative remedies, with change of air, or change to a dry and warm atmosphere, and attention to the digestive, assimilating, and excreting functions, are most deserving of attention. The frequent occurrence of the disease in the scrofulous diathesis indicates the propriety of having recourse to the same means as have been found most beneficial in scrofulous affections. — The appearance of cachectic nephritis during secondary *syphilis* (§138.), or consequent upon it, although occasionally observed, has not been satisfactorily elucidated; inasmuch as it is not proved whether or not the renal disease is a consequence of syphilis, or of the inordinate use of mercury in the treatment of it. The two cases alluded to above (§ 138.) occurred in scrofulous constitutions; mercury was largely employed; the secondary symptoms became aggravated, phthisis supervened, and in this state they came under my care. Hydriodate of potash with sarsaparilla was then prescribed, and, during the use of it, and in an advanced state of the pulmonary disease, albuminous urine and anasarca appeared. These cases prove only the tendency of this disease to appear whenever a state of general cachexia is produced by causes depressing vital power, and impairing the assimilating processes so as to overturn the healthy crasis or constitution of the blood. — I have never met with an instance of this disease connected with *rheumatism*, unless where the treatment has been of a lowering kind; and in this complication the preparations of iron, quinine, and camphor, have been generally prescribed with greater benefit than any other medicines. I have generally preferred the following, or similar combinations: —

No. 283. ℞ Ferri sulphatis: — Quiniæ sulphatis, āā, ℈j.: — Camphoræ rasæ, ʒss.: — Extr. Aloës purif. ℈j.: — Extr. Humuli (vel Extr. Hyoscyami), ℈ij.: — Mucilag. Acaciæ q. s. — *M.* Contunde bene et divide in Pilulas xxxvj. quarum capiat duas vel tres, bis terve quotidie.

170. III. Inflammation of the Pelvis and Calices of the Kidney. — Synon. — *Pyelitis* (from πύελος, pelvis). — *Pyelite*, Rayer. — *Pyelitis*, Prout.

171. Inflammation of the mucous membrane lining the pelvis and calices of the kidneys is distinct from the species of nephritis already described, not only in its seat, but also in its symptoms and consequences. It sometimes assumes an *acute form*, but more frequently a *sub-acute* or *chronic state*. It may affect the pelvis and calices of only *one* kidney or of *both*; and it may be limited to a portion only of their surface, or extended to several calices.

172. i. Symptoms. — Pyelitis assumes varied states, according to its grade of activity, its causes, and other circumstances. It sometimes attends or supervenes upon *catarrhus vesicæ*, or inflammation of the mucous surface of the bladder; and it sometimes even follows *gonorrhœa*, especially when suddenly checked by astringent injections, and *retentions of urine* from strictures or other causes. But it occurs in its most definite and best marked form when it proceeds from the irritation of sabulous or calculous matters in the excretory portion of the kidneys, or is connected with the oxalic acid diathesis. It is occasionally also connected with certain cutaneous affections remotely allied to syphilis.

173. *A.* When pyelitis supervenes upon *catarrhus vesicæ*, or upon *gonorrhœa*, the symptoms are usually uneasiness, or more or less pain and sense of heat in the loins, attended by low febrile action, sympathetic irritation of the testicles, and sometimes by nausea, particularly when the secretion of mucus or muco-puriform matter is unusually large. If the inflammation of the mucous surface of the bladder still continue, the symptoms referable to this viscus predominate, and often mask those more immediately connected with the kidneys. In all cases the symptoms should be examined in connection with the states of the urine.

174. *B.* When pyelitis arises from the *irritation of calculous or sabulous substances* in the excretory portion of the kidneys, the symptoms vary with the constitution and age of the patient, and with the nature and form and situation of those substances. When a calculus or calculi are situated so as not to obstruct the passage of urine from the organ, the inflammation is frequently slight and limited in extent. But when it is large, and is situated at the outlet of the pelvis, or at or in the commencement of the ureter, so as to obstruct more or less, or entirely to close, this opening, the parts above the obstruction generally become inflamed throughout, and distended by urine, mixed with mucus, and often with puriform matter and blood. In these cases, the kidney is greatly increased in bulk, and the local and general symptoms aggravated.

175. Pyelitis, *from calculi*, may be slight, and not exceed a state of irritation not amounting to that grade of inflammation developing general febrile reaction. In such cases the gravelly matters pass from the calices into the pelvis, and thence, by the ureters, into the bladder, occasioning only more or less pain in their transit. But when the calculi, from their size, sharpness, or roughness, irritate greatly these parts, or cannot readily pass along them, inflammatory action, with more or less severe symptoms, is produced.

176. *a.* In the *more acute* cases, a sharp, severe, or lancinating pain is felt in the region of either kidney, descending thence, in the course of the ureter, to the bladder, attended by chills or rigors more or less marked. The urine is scanty, voided by drops, with a sense of heat, sometimes with gravelly matter and a small quantity of blood. The pulse, at first small and oppressed, becomes developed and more frequent, and febrile action supervenes, especially after nausea and vomiting have occurred. If the calculus or gravel is not voided in the course of the following two or three days, the symptoms continue; and if it does not entirely shut up the passage to the bladder, and if only one kidney is thus affected, the urine always contains some mucus and blood. On cooling, the mucus appears in the urine in the form of flocculi, which afterwards fall to the bottom of the vessel; and the blood-globules, when present, form a slight layer on the surface of the sediment. All these symptoms may quickly cease when the calculus has passed into the bladder, and the urine becomes natural.

177. *b.* When calculi remain in the calices or pelvis for a considerable time, the inflammation becomes *chronic*, and the pain ceases to be acute. The patient complains chiefly of uneasiness or of weight in the region of either kidney; but pain, sometimes obtuse, at other times sharp, occurs upon a sudden effort, or unusual movement of the trunk, or when riding either in a carriage or on horseback; and the pain generally extends to the bladder and the course of the ureters, and to the testes and limb corresponding with the affected organ. Numbness as well as pain of the limb is often also felt. Decubitus on the abdomen, or on the side opposite the affected organ, where one only is affected, straining at stool, coughing, sneezing, a deep inspiration, the warmth of bed, &c., generally augment the pain; which, however, may be slight, although several calculi are contained in the pelvis and calices. These pains, thus varying in severity and character—being occasionally slight, sometimes colicky and severe — frequently are independent of any febrile action; but they are usually attended by retraction of the testes, and by a reddish, scanty, and mucous state of the urine, which is slightly coagulable by heat. Sometimes the urine is sanguineolent; at other times it is perfectly transparent, particularly after diluents and demulcents have been freely used. These different states of the urine may be observed in the same person in the course of twenty-four hours. Upon cooling, uric acid, or the salts, are deposited with the blood and mucus, these latter forming the surface of the sediment.

178. When the gravel consists of *uric acid*, as is most frequently the case, the urine is acid, and the sediment contains rhomboidal crystals of a yellowish-red colour. When it consists of the *phosphates*, the urine is alkaline and turbid at the time of emission. Dr. PROUT observes, that when the concretion is lithic acid, the quantity of mucus in the urine, though considerable, is not so striking and characteristic as it sometimes is when it consists of the oxalate of lime. This arises, partly, perhaps, from the diminished quantity of mucus secreted, and partly from the quantity of lithate of ammonia and other matters usually present, which involve and conceal it. Where the calculus is oxalate of lime, the mucus is sometimes voided in large transparent greenish gelatinous masses of considerable tenacity, which occasionally, in passing down the ureter, excite all the acute symptoms. When the renal concretion consists of phosphate of lime, the symptoms are much the same, and the mucus often contains the earthy matter intermixed with it in considerable quantity.

179. *c.* At a more *advanced stage of chronic* pyelitis from calculous concretions, irregular chills or rigors occur, especially towards night or after a meal; and various morbid sensations are felt in the loins — as of pulsation, of tension, of numbness, and even of cold — which often extend down the corresponding thigh. The urine is sometimes sanguineolent, but oftener turbid and whitish, allowing a puriform and white, or slightly greenish-white, sediment to fall, consisting chiefly of pus and urinal salts. The discharge of blood in the urine is occasionally the first remarkable symptom, especially when the pelves of both kidneys contain calculi. Subsequently the urine becomes turbid and puriform, and passes frequently and in small quantity, with or without sabulous matter in it. In the course of the disease, the patient experiences *exacerbations*, characterised by more acute symptoms, by vomiting, and fever.

180. The urine is usually bloody or purulent every time that it is voided, unless one kidney only is affected; and the secretion from the diseased one is partially or entirely interrupted. Great variations, however, both in the frequency of the calls to pass the urine, and in the physical and chemical characters of it, are observable. When purulent urine coming from the inflamed pelvis of a kidney is retained only partially in its cavity, it is mixed in variable proportions with the urine from the other kidney, which may be then perfectly healthy. Hence the urine may, in the course of the same day, be different in appearance at different times — it may be charged with pus or blood, or with both, at one hour, and be clear and healthy at another hour. The urine, therefore

should be frequently inspected. In some cases, M. RAYER states, the suspension for a time of the unhealthy urine is accompanied with an aggravation of the renal distress, and with a febrile state of the system; probably in consequence of the ureter of the affected organ becoming obstructed, and the urine therefore accumulating in its pelvis. The symptoms usually subside when the urine exhibits a purulent admixture. When this fluid is at all purulent, it is found also albuminous; the amount, however, of the coagulum produced by heat or nitric acid is by no means proportionate to the quantity of purulent matter in it.

181. *d.* When chronic pyelitis has existed for a long time, and the excretion of urine along the ureter is much obstructed either by the presence of a calculus in it or in the pelvis, or by any other cause, a swelling may sometimes be distinctly felt in the lumbar region, the swelling occasionally evincing an obscure fluctuation, and appearing irregular or lobular on examination. This tumour is formed by the accumulation of puriform matter in the cavity of the pelvis and calices of the kidney; and, when very large, is felt in the corresponding flank, where it may extend from the margins of the ribs to the iliac fossa. M. RAYER has seen tumours formed by purulent matter distending the pelves and calices of the kidneys weighing as much as from ten to fifty pounds. Owing to the developement of such tumours, the lumbar region is more or less swollen, enlarged and deformed on the affected side. On percussion, the swelling emits a dull sound behind, and generally also anteriorly, unless the colon, distended by air, pass before it. When, however, the tumour is large, the colon is generally pushed aside by it. The right kidney, when thus distended, sometimes adheres to the margin of the liver, and thus seems, on percussion and palpation, to form one structure with this organ, and is often mistaken for a tumour, or for enlargement of it. Tumour thus formed of the left kidney is not so readily mistaken for enlargement of the spleen, unless the examination is very superficial. When the tumour is very large, it generally seems knotted or lobulated, and fluctuation may be perceived in it. Pain is rarely acute in this state, although it may be produced by pressure or succussion of the trunk.

182. *e.* In a few instances, the mucous membrane of the pelvis and calices of the kidney surrounding the calculus becomes thickened, indurated, so as to secrete little or no purulent matter; and these parts form, with the atrophied substance of the kidney, a sac or shell, more or less closely surrounding the calculus. If the opposite kidney is healthy, this change may not be even suspected during life, the patient experiencing no pain, and the urine containing no pus; but if disease, calculus, or obstruction affect the sound organ, suppression of urine and death soon take place. In the less severe and chronic cases of the disease, suppression of urine and death may also occur, especially when both organs are seriously affected, or when calculi obstruct both the pelvic outlets or ureters.

183. These *several states of pyelitis* may be denominated nearly as M. RAYER has named them — 1st, Pyelitis characterised by sharp pain, or nephritic colic, and suppressed or scanty urine (§ 176. *a.*); 2d, Pyelitis with mucous urine and occasional pain (§ 177. *b.*); 3d, Pyelitis with purulent urine, and without renal tumours (§ 179. *c.*); 4th, Pyelitis with purulent urine and with renal tumour (§ 181. *d.*); and 5th, Atrophy of the kidney, the urine being generally clear (§ 182. *e.*).

184. ii. DIAGNOSIS. — Pyelitis may be mistaken for several other diseases; for a *mucous* or *purulent* state of the urine attends inflammation of the bladder or urethra; and lumbar *pain* exists in rheumatism, nephralgia, &c. *Tumour* of the lumbar region also proceeds from diseases connected with the kidney. — *A.* — *a. Pain* in *acute simple nephritis* is sometimes as severe as in pyelitis, but seldom as severe or as sharp as in pyelitis caused by calculi. In this latter, the pain occurs in paroxysms, or presents exacerbations, and is more disposed to shoot in the direction of the ureter, and to be attended by retraction of the testes of the corresponding side. The existence of mucus or purulent matter in the urine will also assist the diagnosis. — *b.* True *Nephralgia* may be confounded with calculous pyelitis; but generally the pain of the latter is more acute and cutting or lacerating than in the former, and is obviously connected with gravel, calculi, and other changes of the urine, above described; whilst the former very rarely occurs, unless in connection with hysteria or with irritation of the uterus. — *c.* In *lumbago* the pain commonly affects both sides alike and at the same time, instead of being felt chiefly or altogether in one side, as in pyelitis; is more continued, and does not extend, in the course of the ureter, to the bladder; and it is exasperated by the movements of the trunk. Lumbago is generally without fever, and often preceded by rheumatic pains in other parts. — *d. Hydatids* in the kidneys are seldom attended by much pain, unless they pass into the pelvis of the organ, and occasion inflammation there or in the calices; where the pains — although less acute — and the other symptoms are nearly the same as in calculous pyelitis. The passage of hydatids with purulent urine will generally indicate their source in the kidneys, when pain is referred to the renal region: but not with certainty, for they may come from cysts connected with the bladder, but this is a very rare occurrence. — *e.* In some rare cases of *suppression of urine* the pain in the region of the kidneys has been severe, and the patient has been carried off by cerebral affection; and yet all the structures of the kidneys have been found free from marks of inflammation. In some cases, very large calculi may lodge in the pelvis without causing either much inflammation or much pain. Occasionally, also, the pain has been felt in the situation of the opposite kidney to that which contained the calculus, or in some part still more remote from the irritated organ. Instances where very large calculi were formed in the kidneys without having produced any marked symptoms, or even much disorganization, are recorded by BAGLIVI, HOULIER, HENRIE, BORALLI, POZZI, MORGAGNI, DE HAEN, VAN SWIETEN, HOWSHIP, and others.

185. *f. Caries of the vertebræ* is generally attended by a dull pain, but it cannot be mistaken for pyelitis unless paraplegia, with retention of urine, and changes in this fluid, take place, and then pyelitis may actually supervene. The state of the vertebral column, and abscess appearing in

some one of its usual situations, will generally show the nature of the disease. — *g. Psoitis* is accompanied with pain, which is continued and often severe, extending from the lumbar region to the pubis and top of the thigh, the trunk being bent forward, and to the affected side. Motion of the thigh is extremely painful, and œdema of the limb often occurs. If suppuration take place, the abscess increases the œdema, but its situation is lower, and more anteriorly than that of the puriform collection in the pelvis of the kidney consequent upon pyelitis. If the abscess open into the bladder, the diagnosis will be more difficult, as in a case recorded by Mr. Howship. — *h. Aneurism* of the *abdominal aorta* gives rise to pain, very much resembling nephritic colic, or the renal pain attending calculi in the kidney. The pulsation of the tumour, the evidence furnished by auscultation, and the state of the urine, will, however, indicate the disease. When tumour is inconsiderable or absent, the nature of the lesion is obscure, particularly in its early stages. — *i.* Inflammation of a portion of the *colon* in the vicinity of the kidney can hardly be mistaken for pyelitis, for the state of the bowels, and the appearance of the urine, will prevent them from being confounded with one another. — *k. Hysterical pains* in the region of the kidneys are characterised by abundant, pale, and transparent urine, and by other indications of *hysteria* (see the article). Hysterical patients are, however, liable to disorder of the *excretion* of urine, but not to those *characteristics* of this fluid attending inflammations of the kidneys; and they are prone to attempt various deceptions connected with the performance of this function.

186. *B.* The excretion of *mucus* and *muco-puriform or purulent matter* in the urine may take place in other diseases besides pyelitis, and especially from *acute* or *chronic inflammation of the bladder*, which may simulate disease of the kidneys; this latter also, in its turn, often simulating disease of the bladder. In all cases it is most difficult to determine, by the appearance of the urine only, whether the kidney or the bladder is inflamed; in some cases both are affected, although not equally. In most instances, the urine is glairy and viscid in *cystitis*, and there is pain or uneasiness in the bladder, but there is no pain or swelling in the loins, nor any of the sympathetic feelings depending upon pyelitis. The urine is generally less puriform and opaque than in this latter disease, the dysuria attending which being usually connected with the presence of pus. However, if the puriform urine of pyelitis be alkaline, it will become both glairy and viscid; and the secretion from the inflamed surface of the bladder is not always glairy. The absence of pain in the region of the bladder, whilst severe or sharp pain is felt in either lumbar region, will also assist the diagnosis.

187. *C.* The *tumours* consequent upon chronic pyelitis, with occlusion of the outlet of the pelvis or ureter, may be confounded with others, and it is sometimes of importance to form a correct diagnosis between them. — *a.* M. Rayer remarks that a collection of urine in the pelvis of the kidney, owing to obstruction of the ureter (*hydronephrosis*), causes a tumour or enlargement of the lumbar region, very closely resembling that produced by an accumulation of pus in the same situation; that both are lobulated, dull on percussion, and evince fluctuation; but that the latter is the seat of occasional pain, or becomes painful on pressure, and is attended by fever — phenomena which seldom accompany the collection of urine merely. Besides, when the passage from the kidney is not entirely obstructed in pyelitis, the urine is somewhat puriform and opaque. — *b.* An *abscess* seated in the cellular tissue in the vicinity of the kidney may be mistaken for purulent collection in the pelvis of this organ. But, in the former, fluctuation is more superficial and manifest than in the latter, and there is generally œdema of the sub-cutaneous cellular tissue in the lumbar region, an œdema never met with in the latter. Cases, however, may occur of an abscess forming externally to the kidney in connection with an accumulation of purulent urine in the pelvis and calices; but these are rare, and occur chiefly when a fistulous opening is formed between the pelvis and the adjoining cellular tissue. Ulceration, caused by calculi, penetrating the pelvis may give rise to abscesses which may open either externally or into the colon, or even into some other viscus; and one or more renal calculi may be voided in these situations, either subsequently to, or along with, the discharge of pus. The origin of these fistulæ is shown by the urinous odour of the discharge and by the presence of uric acid, or of the urinous salts, or of calculi: still these signs may be wanting for a time, although one or other of them may recur from time to time.

188. *c. Stercoraceous abscess* may form in the vicinity of the kidney, owing to perforation by ulceration of a part of the colon. If such abscess point externally, the diagnosis will be easy; for the escape of fæcal matters and of intestinal gases will show its nature. *Abscess* consequent upon *caries* of the *vertebræ*, and abscess arising from *psoitis*, may be distinguished by the history of the case, by the antecedent symptoms, especially as regards the state of the vertebræ and the movements of the thigh, and by the other phenomena already alluded to (§ 185.), particularly those connected with the excretion and state of the urine.

189. *d. Tumours*, or swellings in the region of the kidney, may proceed from *other diseases* than the above, and render the diagnosis of distension of the pelvis and calices of this organ by puriform matter more or less difficult. These diseases are *cysts* in or near the kidney, containing *hydatids;* simple, or *serous*, or *urinous cysts* of large size; tumours developed in the *supra-renal capsules; aneurisms* of the abdominal *aorta; enlargements* of the *spleen; tumours* or *cysts* connected with the right lobe of the *liver;* enlargement of an *ovary;* accumulations of *fæcal matters* in the *cæcum* or *colon;* and *extra-uterine* pregnancy. Of all these, it is unnecessary to take particular notice. The recollection that these may severally closely resemble, in their situation and local signs, the consequences of chronic pyelitis now under consideration, and the attention to the existing phenomena which the recollection will excite, cannot fail of guiding the practitioner to a right conclusion. The history of the case, the sympathetic pains, the states of the stomach and bowels, and, above all, the appearances of the urine, and the circumstances attending the excretion of it, will

receive from him the fullest consideration, and serve to point out the seat of disease.

190. iii. Prognosis. — *Pyelitis* in its *first* or more *acute form* (§ 176.), arising from urinary concretions, is generally not attended by danger when one kidney only is affected. But the *second* and more especially the *third* and *fourth* states of the chronic disease are always of more or less serious moment even when one kidney is implicated: if both organs are diseased, the prognosis is still more unfavourable, for the contingencies of ulceration of the pelvis of the kidneys, of atrophy of their structure, of suppression of urine and its consequences, and various other results of less frequent occurrence, are to be expected in a large proportion of such cases. Anticipations should be still more unfavourable if a puriform collection in the pelvis of the organ arise from obstruction at its outlet, and thus form a tumour in the loins, unless it opens externally: in this latter case, it often terminates favourably. The *complications* of *chronic pyelitis* with other lesions of the kidney or of the urinary organs, or with other maladies (§ 192. *et seq.*), render the prognosis extremely unfavourable.

191. In cases of *tumour* or *abscess* of the kidney consequent upon the obstruction of a calculus, as described above (§ 187.), suppuration and ulceration may proceed, as already mentioned; and if the swelling point in the loins, the calculus or calculi may escape in this situation, by the spontaneous or artificial opening of the abscess, and the patient recover. Proceeding upon the results of such cases, some physicians have recommended either that an incision should be made into this tumour at a proper period of its progress, or that caustic should be used in opening it. Each of these modes of procedure may be resorted to, and be successful in cases to which they are severally appropriate. It is most probable that, in the successful cases of these operations on record, the calculi had passed by ulceration from the pelvis of the kidney into the cellular tissue exterior to it, and that they had been extracted from an extra-renal abscess formed by it.

192. iv. Complications. — *A.* Inflammation of the pelvis and calices of the kidney occurs more frequently in connection with inflammation of the vascular and tubular structures than in a simple or uncomplicated state; or, in other words, *pyelo-nephritis* is more common than either *simple nephritis* or *simple pyelitis*. — *a.* When *pyelitis* is the primary affection, *nephritis* often supervenes; and, as a consequence of the former, or of pyelo-nephritis, *atrophy* of the cortical and tubular structure is the most frequent. Ulceration and *perforation* of the pelvis of the kidney is less common than atrophy of the organ; but, when it takes place, abscess external to the kidney generally forms, with or without the escape of the calculus that caused it. Although only one kidney is affected, still functional disorder may at the same time be extended by sympathy to the other. *Calculous pyelitis* of both kidneys is not rare. M. Rayer refers to several instances of the double malady. In the more prolonged cases of chronic pyelitis of one organ, the other either remains healthy or is *hypertrophied* consequently upon increased function.

193. *b.* Pyelitis is often attended by *hæmorrhage* from the kidney, particularly when caused by calculi; and the hæmorrhage may prove critical of pre-existing *pyelo-nephritis*, the inflammation of the substance of the organ being abated or altogether removed by the discharge. This association has been aptly named by M. Rayer *Hæmorrhagic pyelitis* and *Hæmorrhagic pyelo-nephritis*, and is certainly not of unfrequent occurrence in connection especially with calculi in the kidney, although the sanguineous state of the urine constitutes apparently the chief, but actually the least important, part of the malady.

194. *c. Pyelitis*, in any of its states, may be associated with disease of the *prostate gland*, or of the *bladder*, or of the *urethra*, or of all of them, and these affections may be further complicated with stone in the bladder. In the majority of such cases, the *ureter* or ureters are also affected, being either *dilated* or *constricted*, or both dilated and constricted in different or alternate parts. Sometimes the coats of the ureters are *thickened*; and occasionally a complete obliteration of the canal of one of them is found in some points, which are either occluded by a whitish firm albuminous deposit, or are reduced to a fibrous chord. Mr. Coulson very ably remarks, that when an urinary *vesical calculus* has been formed for years, and has brought on severe symptoms, and especially when attended by stricture of the urethra, or enlarged prostate gland, the kidneys, though before healthy, become involved; the severe dysury causes enlargement of the ureters from distension of the retained urine, and inflammation extends along them, even to the kidneys themselves. The pelvic cavities become altered in shape and enlarged, the infundibula extended or unfolded, and the internal membrane of all the cavities thus acted upon, from repeated attacks of inflammation, is thickened, and furnishes a catarrhal secretion. The parenchymatous substance of the kidney is more or less absorbed, the mammary projections are obliterated, spurious hydatids occupy the cortical part, and all the serious evils, ulceration, contiguous abscess, or gangrene, are met with as sequelæ of vesical calculus.

195. When pyelitis is associated with inflammation or other diseases of the *bladder* or *prostate gland*, the severity of the symptoms in these organs may render obscure or altogether mask the affection of the kidneys; and this is the more likely to be the case, inasmuch as pyelitis is commonly the consecutive or superinduced malady: and it may even continue after the disease of the bladder has been removed. It is a more rare occurrence for pyelitis to propagate itself along the ureter, so as to occasion *true cystitis*, and it is met with chiefly when sabulous or gravelly matters, occasioning pyelitis, pass into the bladder and inflame it or the urethra, or when purulent matter from the pelvis of the kidney produces the same effect, which, however, seldom arises unless this matter is retained for some time in the bladder, or undergoes some degree of decomposition, or occasions an ammoniacal state of the urine, or unless the urine is more or less alkaline when it passes into this viscus. It should be recollected that, when great irritation is produced by calculi in the kidneys, severe symptomatic pains are sometimes felt in the bladder, without any actual disease existing in it; but it is much more common to find very serious lesions in the kidneys, although no pains in the loins had been complained

of, disease of the bladder, or calculus there, being the only apparent malady. Thus it has happened that able surgeons, before undertaking the operation of *lithotomy* or of *lithotrity*, have examined attentively the regions of the kidneys, without detecting any sign of disease of these organs; and yet, after the operation has been performed, a violent rigor, or shiver, has taken place, followed by fever and death; and, upon dissection, not only have calculi and pus been found in the pelvis of the kidney, but also the substance of the organ has been more or less inflamed, or otherwise altered. These *latent states* of pyelitis occur not only in connection with vesical calculi, but also with other maladies of the bladder and prostate gland; and they are *latent* merely from want of due attention to, or due knowledge of, the states of the urine attending the renal disease, this fluid generally containing purulent matter, or pus globules, readily miscible with it, and very distinct from the glairy mucous sediment accompanying chronic cystitis — the urine in pyelitis being puriform, that of cystitis being mucous and glairy: when, therefore, the one disease is complicated with the other, there is commonly a mixture of puriform matter with a mucous or a glairy substance; and the one predominates over the other, according as the one disease is more severe than the other. Some modifications, however, of the urine in these diseases, and in their complications, arise from the saline constituents or deposits, which often change the appearances of those morbid secretions, an alkaline state rendering purulent urine more glairy than its acid or neutral conditions. Moreover, it should be recollected that, in very chronic and prolonged cases of cystitis, the urine is often more or less purulent, or contains pus globules mixed with mucus.

196. Whenever disease of the bladder or of the excretory urinary canals is attended by retention of urine, there is a great risk of the supervention not only of pyelitis but also of nephritis, as a consequence of, and in connection with, pyelitis, — either this latter simply, or pyelo-nephritis, occurring as a result of the disease of the excretory urinary apparatus; and the malady, thus superinduced in the kidneys, may be *acute* or *subacute* in the one organ, and *chronic* in the other.

197. *d.* Calculous pyelitis, in any of its forms, may be associated with *pregnancy;* for, when there are calculi in the kidneys, they are more likely to give rise to inflammatory irritation at this period than at any other; unless indeed, soon after delivery, when calculous pyelitis occasionally takes place.

198. *e.* Pyelitis is sometimes complicated with other diseases; but it is unnecessary to describe fully the phenomena attending it when thus associated. A bare enumeration of the maladies with which it is most frequently connected will serve to direct attention to the subject, and will suggest to the physician when such complications may exist or supervene. Pyelitis may occur after injuries or diseases of the spine; and may be further associated with lesions of the bladder and prostate gland. In all such cases, especially when interruption of the excretion of urine takes place, cerebral affections of a most dangerous kind are apt to appear. Disorders of the digestive organs, gout, diseases of the vascular system, and fevers, are not unfrequently connected with pyelitis; indeed there is scarcely a malady which may not be complicated with it, particularly in persons far advanced in life.

199. *B.* PYELO-NEPHRITIS, or *inflammation of the pelvis, calices, and substance of the kidneys,* is the most important of the above complications, and occurs oftener than either nephritis or pyelitis simply. — *a.* In pyelo-nephritis, the inflammation generally commences in the pelvis and calices, and rarely in the substance of the organ. Hence it generally proceeds from the same causes as are productive of pyelitis, as the irritation of calculi, interruptions to the excretion of urine, and inflammation propagated from the urethra, bladder, or ureters, &c. It is more prevalent in males than in females, and in persons advanced in age than in the young. In these respects, however, it agrees with the other forms and complications of *nephritis*, deaths from this disease, according to Mr. FARR's letter to the Registrar-General (*Third Annual Report of Births, Deaths, &c.*), being in the proportion of 21·20 males to 7·60 females, or nearly 3 to 1, in the years 1838 and 1839; and from diseases of the *urinary organs* generally being 1275 in the former to 259 in the latter, or 12·750 to 2·590, or about 6 to 1, in the same years.

200. *b.* Pyelo-nephritis may be either *acute* or *chronic;* it may be limited to one kidney, or extended to both; and it may be more or less acute and severe in one organ than in the other: it may, moreover, present the following states, according to its *causes* and prominent *characters:* it may be, — 1st, simple inflammation of the pelvis, calices, and proper structures of the organ; 2d, inflammation of these parts in connection with gravelly or calculous substances; 3d, inflammation accompanied with hæmorrhage, or hæmaturia; and, 4th, inflammation with a disposition either to albuminous exudations or to gangrene, according to the state of constitution of the individual and intensity of the disease. Of these, the last is the most uncommon.

201. *c.* In these forms of pyelo-nephritis, mucus and pus globules may be detected in the urine; but they will not be observed in simple nephritis, or when the inflammation does not extend to the calices and pelvis of the kidney. When pyelo-nephritis follows lesions of the urethra, prostate, or bladder, it commonly extends to both organs, but both do not present the same extent and grade of inflammation. When it proceeds from injury, or when the disease commences in the cortical and tubular structure — a comparatively rare circumstance — and extends to the calices and pelvis, or when it is caused by calculi, then only one kidney is generally affected.

202. *C.* PERI-NEPHRITIS, or *inflammation extending to the fibrous, cellular, and adipose tissues surrounding the kidney*, rarely occurs, unless after injuries or wounds implicating this organ and those tissues, and when calculous pyelitis is followed by ulceration and perforation of the pelvis of the kidney, and by *renal fistula*. It is chiefly in these circumstances that peri-nephritis is usually met with, and it is then associated either with nephritis, or with pyelitis, or pyelo-nephritis.

203. *a.* It rarely appears in a *primary* and *simple* form, and as rarely can be detected as such during life, or until it passes into abscess, when it assumes nearly the form of abscess consequent upon pyelitis with perforation of the pelvis of the kidney

(§ 187.). Instances, however, have been recorded of primary inflammation of the *celluloadipose* substance surrounding the kidney after injuries, and the impression of cold; but it is more common as a consequence of the passage of purulent matter into the circulation, of severe fever or erysipelas, of ulcerative perforation of the colon; and in these circumstances it has been found chiefly upon examination after death. Peri-nephritis more frequently follows caries or fracture of the vertebræ, and in these, as well as in other circumstances of its occurrence, generally gives rise to abscess of greater or less extent. When this takes place, fulness or swelling of the loin of the affected side, with obscure fluctuation and œdema of the sub-cutaneous cellular tissue over the part, is usually present. When abscesses form in this situation, they may involve the kidneys, pelves, and ureters, more or less, and they may extend to and open in immediately adjoining viscera, or parts considerably remote.

204. *b.* When peri-nephritis is *simple*, or has not involved the kidney, pelvis, or ureter, and is independent of disease of these parts, it is generally obscure. The urine does not present the characters marking the presence of nephritis or pyelo-nephritis; but there is much tenderness of the loin and symptomatic fever, soon followed by œdema and swelling. As soon as purulent matter forms, it increases, and accumulates between the peritoneum and lumbar muscles; and it may thence extend to the iliac fossa or crural arch; or it may open into the peritoneal cavity, or into the colon or rectum; or it may make its way in other directions, as in the lumbar region, or at or near the angle formed by the spine and posterior part of the crest of the ilium, on either side of the lumbo-sacral or lumbo-iliac ligaments. When the abscess is opened early in these situations, particularly the latter, recovery may take place; but this result will depend chiefly on the nature of the original disease, or of its causes and associations. These abscesses have usually been denominated *lumbar* or *psoas abscesses*, and are more fully noticed in the article ABSCESS.

205. *c. Gangrene* is a much rarer termination of peri-nephritis than suppuration. In a remarkable case of the primary and simple form of this malady — the inflammation apparently commencing in the cellulo-adipose tissue surrounding both kidneys — recorded by Dr. TURNER (*Med. Trans. of Coll. Phys.*, vol. iv. p. 226.), the disease followed exposure to a current of cold air after being overheated by prolonged exercise on horseback. Severe pains were felt in the loins, and the symptoms were altogether violent and obscure. The urine was natural in quantity, and there were no unusual calls to pass it. Death speedily ensued. On examination, the cellulo-adipose tissue surrounding both kidneys was found quite gangrenous: the capsules of both organs were inflamed; but the substance of the kidneys was only slightly inflamed.

206. *d. Peri-nephritis* may, therefore, arise from inflammation extending from the kidney to the surrounding cellulo-adipose tissue; but this rarely occurs, unless the pelvis of the kidney is perforated by ulceration, especially in calculous pyelitis, as shown above (§ 187.); and when such perforation occurs, a *renal fistula* is often formed in consequence of it. If peri-nephritis arise independently of disease of the kidney, it may be either *primary* and *simple*, or it may be *consecutive* of other maladies, especially of lesions of the parts in the vicinity and of constitutional disease, as alluded to above, and more fully in the article ABSCESS.

207. *D.* RENAL FISTULA. — *Renal fistula* may follow wounds implicating the kidneys, or their pelves or ureters; but they are more frequently the consequences of inflammation of the pelves and calices, which become distended by puriform matter, owing to obstructions to its passage to the bladder; and these obstructions are commonly caused by the impaction of one or more calculi in the pelves or ureters. The accumulated matter may find its way, by ulceration and distension, into the surrounding cellular tissue, and thence open either in the lumbar region, or near the crural arch, or in the colon or duodenum, or in the peritoneal cavity, or even in the corresponding pleural cavity or lung. These fistulæ commonly extend from the pelvis and calices into the cellular tissue upon which the posterior aspect of the kidney rests. In these cases, an extra-renal abscess, more or less extensive, forms, and proceeds in one or other of the directions just named. The most frequent and most favourable situations in which it points are the lumbar region and near the crural arch. In the other situations where a fistulous communication has been formed with the kidneys, examinations after death disclose the nature of the lesion, and, in some cases, prove the accuracy of the diagnosis which had been formed from the swelling in the region of the kidneys, and from the nature of the matters voided during the life of the patient.

208. v. TREATMENT OF PYELITIS. — *A.* In the *early* and *acute state* of pyelitis, the chief *intention* should be to diminish local vascular action, and to alleviate the more urgent symptoms. Local *bloodletting* by cupping over the loins, or the application of leeches to the perineum and around the anus; the warm bath, or the semicupium; mucilaginous and emollient beverages; opium or other anodynes, with demulcents, &c., are the chief means by which this indication may be fulfilled. When pain is very acute, and is attended by suppression of urine, frequent vomiting, or spasmodic attacks, cupping on the loins should be decidedly employed and repeated, and be followed by the warm bath: pills, containing camphor, opium, or belladonna, may be taken: frictions or embrocations with any of the *liniments* prescribed in the *Appendix*, to which opium or the extract of belladonna has been added, may be applied to the loins or abdomen, and emollient and laxative enemata with henbane may be administered. The preparations of ether, or the spirits of nitric ether, with the compound tincture of camphor, the alkaline carbonates and anodynes, may likewise be prescribed, in mucilaginous mixtures, and in some cases with one or other of the preparations of *colchicum*. The more violent symptoms generally subside in a few hours, owing either to the change in the position of the calculus, to which they are generally owing, or to its passage into the bladder. In some cases, the calculus or calculi, or gravelly matter, is passed with the urine, and relief is obtained. In these more severe attacks or paroxysms, and after the above means have been employed without relief, *dry cupping* on the peri-

neum, or over the course of the ureter, may be tried. When a calculus is obstructing and irritating one of the ureters, as indicated by the seat of pain, and by the sympathetic phenomena, I have found this means sometimes successful. *Purgatives*, especially calomel, or calomel with opium, followed in a few hours by castor oil, or any suitable purgative draught, or by emollient and laxative enemata, are generally of service. *Emetics*, and standing with the feet on cold stones, sometimes advised in these circumstances, have appeared more injurious than beneficial; but ipecacuanha or emetic tartar conjoined with opium, and given so as to occasion more or less nausea for some considerable time, has occasionally been of service. When the acute symptoms indicating the presence of a calculus in the pelvis of the kidney, or in the ureter, have subsided, and the patient has not voided it, the urine still continuing to be charged with mucus, a catheter or sound should be passed into the bladder, in order to ascertain whether it is in this viscus or not, so that it may be removed by such medical or surgical means as may be deemed most appropriate.

209. *B.* The *second indication* is to remove chronic inflammatory action in the kidney, and to counteract the disposition to form calculi, or gradually to dissolve them by physical means suited to the morbid disposition, and to the presumed nature of the urinary deposits. — *a.* This indication is more especially appropriate to the *chronic* or *second* and *third* states of the disease (§ 177—9.). The morbid condition of the urine, in most of these cases, is owing to the states of digestion and assimilation, in connection with excess in the quantity, and with inattention to the quality and congruity of the food. The chronic inflammatory action existing in the kidneys is also thereby perpetuated, and in its turn assists in determining the seat and form of the urinary deposit. In these states of disorder, a *restricted diet*, or a diet suited to the states of constitutional power, and to the amount of exercise habitually taken; attention to the digestive, assimilative, and excreting functions; regulated exercise in the open air; occasionally small cuppings on the loins, or a seton or issue in this situation, or a recourse to terebinthinate embrocations applied on the lumbar region, and various remedies taken internally, may be prescribed.

210. In this state of disease alkalies and the alkaline carbonates in various forms of combination have been employed. But they are not suited to all cases, nor is a persistence in the use of them without inconvenience or even devoid of risk. Even in those cases for which they are most appropriate — where uric acid deposits are observed, — they may so impair the digestive functions as to increase the evil they are employed to remedy. In every case, the selection of internal remedies should be directed by the chemical state of the urine, and particularly by its *acidity* and *alkalescence*.

211. *b.* When the urinary deposit indicates the presence of the *lithic acid* calculi in the kidney, — the most frequent form of concretion, especially in gouty and plethoric persons, — cupping freely on the loins, calomel with colchicum or henbane, and brisk purgatives; alkaline and gently diuretic substances in mucilaginous mixtures; a farinaceous or milk diet, simple diluents, and regular exercise in the open air, are the most beneficial means.

212. *c.* When we infer, from the nervous and the hypochondriacal state of the patient, and from characters of the urine, that the affection of the kidneys is connected with the *oxalate of lime* concretion, depletions and evacuations are not so requisite as in the foregoing circumstances. The means which are most serviceable for removing this form of concretion are diuretic purgatives, or diuretics only; and more especially the dilute nitro-muriatic acid, with either the nitrous ether, or the hydro-chloric ether. In addition to these, sedatives, as henbane, the compound tincture of camphor, the warm bath, regulated diet, consisting of animal food and the purest farinaceous articles, attention to the digestive and excreting functions, and exercise in the open air, are generally beneficial.

213. *d.* When the affection of the kidneys is connected with the *cystic oxide* or *phosphatic concretions*, as caused by the cachectic, debilitated, or exhausted state of the constitution, and by the alkalescent condition of the urine and the composition of its deposits, a course of sarsaparilla; warm rubefacient or terebinthinate embrocations and fomentations on the loins, or setons or issues in this situation; demulcents and sedatives, and the remedies just mentioned (§ 212.), may then be employed.

214. *e.* During the *descent* of these or of other calculi, the means already advised (§ 208. *et seq.*), warm fomentations, warm diluents and sedatives; emollient enemata; nauseating doses of ipecacuanha or of antimony; the various kinds of soap, with opium, belladonna, or henbane; the infusion of *diosma* with medicines appropriate to the nature of the urinary concretion; and citrate of ammonia or nitre in demulcents, may be prescribed according to circumstances.

215. *f.* When the *chronic states* of pyelitis are characterised by a puriform state of the urine, the infusion of *diosma*, or the infusion, decoction, or extract of *uva ursi* or of *pareira*, may be prescribed, and be conjoined with anodynes when pain is complained of. If, in connection with this state, the uric acid gravel be formed, or if the urine be acid, and if the patient manifest a gouty diathesis, the alkalies or alkaline earths may be also given, or ammonia and camphor may be combined with these, and with narcotics, or, still more advantageously, with *colchicum*. The *balsamic* and *terebinthinate remedies* have been recommended in cases of chronic pyelitis with puriform urine, and are often very serviceable; and they may be exhibited in the combinations just mentioned, or consolidated to a pilular consistency by means of magnesia, when the urine is acid; but their effects should be carefully watched. As soon as the urine becomes at all *alkalescent*, or even neutral, the *nitric* or *hydrochloric acid*, or the nitro-hydro-chloric acid, conjoined with the ethers above mentioned (§ 212.), and with tonic restorative or alterative remedies, should be employed. Dr. PROUT justly remarks, that when the affection of the kidney seems to be of a scrofulous character, the same general principles of treatment as have been developed with respect to the nature of the renal concretion should be kept in view; but the tonic and restorative plan usually adopted in that form of cachexia should also be applied, as far as circumstances

will permit. For these cases, warm sea-bathing is often particularly advantageous.

216. *g*. The *diet* should be easy of digestion, and free from all stimulating condiments. When a plethoric state of the abdominal viscera, or the gouty or lithic acid diathesis prevails, a milk or farinaceous diet is often beneficial. Hard waters are generally prejudicial, and increase the pain in the loins. Yet many of the milder effervescing alkaline and chalybeate mineral waters, as the Seltzer, Pyrmont, Ems, &c., are often of service, when judiciously taken.

217. *C*. In that state of the disease characterised by accumulation of puriform matter in the pelvis and calices, so as to *occasion swelling or tumour in the loins*, the treatment is generally difficult, and the question of operation, recommended and performed by the older as well as by modern surgeons, may in some cases be entertained. As long, however, as a more or less copious discharge of puriform matter occasionally takes place in the urine, and if the tumour be partially diminished from time to time, or does not increase, whilst signs of inflammation of the adjoining viscera, or great tenderness of the tumour and surrounding parts on pressure, or hectic fever, or diarrhœa, is not observed, perfect repose, a regulated diet, a recourse to small local depletions as soon as exacerbations of inflammatory action occur, warm baths, fomentations, and the use of such medicines as have been already recommended to be taken internally, according to the prevailing diathesis and presumed nature of the obstruction or calculous concretion, are the means chiefly to be relied upon with the object of repressing exacerbations of inflammatory excitement, and of ultimately removing the interruption to the passage of the accumulated matter.

218. When, however, the renal tumour forms in a person of previously good constitution, and is painful, notwithstanding vascular depletion, mucilaginous drinks, and warm baths; if there be much symptomatic fever, with nocturnal exacerbations; if the stomach and bowels are irritable; if the tumour becomes more painful on exercise; and if suppression of urine takes place, or if inflammation extend to adjoining viscera, the propriety of having recourse to the operation of nephrotomy becomes more manifest; and still more so if fluctuation in the tumour is more superficial and extended, showing a large accumulation of pus to have formed in the cellular tissue between the kidney and lumbar muscles. The great depth of the abscess, and the slowness with which it makes its way to the external surface, as well as the risk of its opening internally, or changing its direction when left long to itself, are arguments in favour of an early recourse to the operation. It should also be recollected that those collections, particularly when they involve, by perforation of the pelvis of the kidney, or otherwise, the cellular tissue on which the organ rests, are generally fatal if they open internally, or otherwise than in the more favourable external situations, or when not aided by art. The circumstances of the case, and the progress of the tumour, will determine the surgeon whether or not the operation should be performed by incision only, or by incision and puncture, or by cauterisation and incision. M. RAYER, who is favourable to the performance of the operation under the circumstances now alluded to, assigns the following states as not admitting of having recourse to it, and surely no one could contemplate it in such cases: — 1st, When it is supposed, from the symptoms and history of the case, that both kidneys are affected, and probably contain calculi, and whilst extra-renal abscess is not yet formed — an abscess, the opening of which should not be deferred; — 2d, Whilst the puriform matter continues to pass off with the urine; whilst the renal swelling is but slight, and there appears to be no risk of the immediate perforation of the pelvis of the kidney; and whilst the kidney of the opposite side continues to discharge its duties, or performs an increased function; — 3d, Whilst serious or dangerous lesion exists in the bladder or prostate gland, or in one or more of the other viscera.

219. IV. OF VARIOUS ORGANIC LESIONS OF THE KIDNEYS. — i. *Of Hæmorrhage in or from the Kidneys.* — *Hæmorrhage*, generally to a small amount, often accompanies *inflammations* and active *congestions* of the kidney, especially the *acute form* of cachectic nephritis, and pyelitis when caused by renal *concretions*. In these cases, the blood is mixed with the urine, in the form of blood-globules, sometimes with mucus, and occasionally with both mucus and pus globules. *Renal Hæmorrhage* may take place: — 1st, from the external surface of the kidney: 2d, into some part of its substance; and, 3d, from the interior of the calices and pelvis.

220. *A. Hæmorrhage* very rarely takes place from the *external surface* of the renal capsules, unless after wounds and other injuries. Blood sometimes is effused between the surface of the organ and its fibrous capsule, most frequently owing to injury, and, in rarer instances, to great congestion of the organ, either consequent upon inflammation of the emulgent veins, or upon interrupted circulation through the right side of the heart.

221. *B. Hæmorrhage into the substance of the kidney* occurs in the form of *petechiæ* or *ecchymoses*, as in malignant and adynamic fevers, scurvy, and purpura hæmorrhagica; or of larger deposits or collections, as in cerebral apoplexy — the *renal apoplexy* of French pathologists — so as to form considerable clots. These latter are rare, and when the patient lives for some time after their occurrence, the coagula are found to have undergone similar changes to those manifested by them in other viscera.

222. *C*. When *blood exudes from the surface of the calices and pelvis*, it may either accumulate there and in the ureter, or it may pass off more or less intimately mixed with the urine. The hæmorrhage may proceed from injury, contusion, succussions of the trunk on horseback, or in a carriage, or on descending stairs; or from inflammation, congestion, or other diseases attended by obstructed return of blood by the renal veins; or from calculous pyelitis. When the hæmorrhage in this situation occurs suddenly, and in considerable quantity, the blood may coagulate either in the pelvis or in the ureter, and thus occasion more or less obstruction to the passage of urine from the kidney to the bladder; but such is not frequently the case, for the blood commonly passes along with the urine, presenting appearances varying with its quantity, with the state of constitution and of disease, with the nature of the secretions accompanying it, and with the duration of its retention in the bladder.

223. Hæmorrhage *from* the calices and pelves of the kidneys may be—1st, *Symptomatic* of diseases of these organs; especially of renal calculi, of cancer and fungus hæmatodes, and of those just enumerated (§ 220—222.); — 2d, *Constitutional* or *essential*, or dependent upon diseases characterised by depression of vital power, by weakened vital cohesion of the soft solids, and by a morbid state of the blood, as in malignant or adynamic continued and eruptive fevers, in purpura hæmorrhagica, scurvy, &c. — 3d, *Supplemental*, or caused by suppression of accustomed or of periodic discharges, and become recurrent or periodic, as when it follows suppression of the hæmorrhoidal discharge, of the catamenia, of epistaxis, &c.; —and, 4th, *Endemic*, which is rarely observed; but M. RAYER mentions it amongst the endemics of the Isle-de-France. In the second of those varieties of hæmorrhage from the kidneys, the blood is always very intimately mixed in the urine, is never coagulated, and generally imparts a dark colour to the fluid. In the others, it may be connected with fibrinous shreds in the urine, or with coagula, generally very small. The quantity of blood varies from the slightest tinge, to a very copious admixture, or large proportion of it, in the fluid voided. The blood may flow from only one, or from both kidneys: it generally is exuded from both in the 2d, or the constitutional form of the above varieties.

224. Persons subject to, or suffering renal hæmorrhage, generally complain of pain, or of a sense of weight, in one or both loins, generally increased upon firm pressure; but these feelings may be wanting in the essential or constitutional form of the disease. Occasionally the pain is acute, or is colicky, particularly when it proceeds from calculi in the kidney, or from fibrinous clots obstructing the pelvis or ureter. When it arises from vital depression and the state of the blood, the hæmorrhage may be so great as to occasion general anæmia, a result rarely occurring in other circumstances.

225. ii. *Congestion, or hyperæmia of the kidneys*, is sometimes found after death from diseases, when this state was scarcely expected to be seen. It is most frequently found in connection with diseases of the heart, particularly those attended by interrupted circulation through the right side of this organ; and when the return of blood by the renal veins is impeded by any lesion either of them or of related parts. Sometimes the engorgement is so great, that the blood gushes out when an incision is made in the kidneys. It may affect one or both kidneys, always both when the cause is constitutional, or when it depends on disease of the heart, and in diabetes. When the congestion is considerable, the kidneys present a chocolate colour, and are large or swollen.

226. iii. *Anæmia of the kidneys* also is occasionally observed after death from diseases in which this state of these organs could hardly be anticipated. It is observed chiefly in persons who have died of chronic maladies, as phthisis, cancer, chlorosis, uterine hæmorrhages, and the advanced stages of granular degeneration of the kidneys, or chronic cachectic nephritis, in connection with dropsy and scanty urine. In some cases, the kidney is so pale as to contain scarcely a drop of blood; and this state may extend to all the organ, or may affect only, or chiefly, the cortical, or the tubular structure. In other instances, the kidney is pale in patches, or natural or red in others, generally in the cortical substance. Occasionally it presents a yellow colour, which is either uniform or spotted with red or white; the whole structure of the organ being remarkably diminished in vascularity. When they are thus bloodless, they are sometimes also *soft* and *flaccid*, but they are occasionally also *firm*, and even *indurated*, and moreover *atrophied*. They are, however, more commonly *granulated*, as about to be noticed, and as described above (§ 103.). The functional derangements consequent upon this state are chiefly a serous, morbid, or defective state of the urine; dropsical effusions; and a diseased or poor condition of the blood, or deficiency of its red globules.

227. iv. *The Nutrition of the Kidneys* is sometimes much altered.—*a.* Occasionally they are much *larger* than natural, without any lesion of structure. This simple *hypertrophy* is often limited to one organ, particularly when the other is wanting, or is much smaller, or when it is destroyed by disease. Hypertrophy of one kidney has been observed where two renal arteries have been transmitted to it; and also where it received, besides its ordinary supply of nerves from the semilunar ganglion and lesser splanchnic, several branches from the second lumbar ganglion. (LAUTH.) Hypertrophy of both kidneys is often observed in cases of diabetes. They are enlarged, or rather distended, by the augmented vascularity or congestion, and the granular deposits, of the early stages of cachectic nephritis, than strictly speaking hypertrophied.

228. *b. Atrophy of the Kidneys* may be consequent upon anæmia or granular deposits, or both, or it may be independent of both. It has been observed, in connection with smallness of the renal artery, with compression of the organ by large tumours in the vicinity or attached to the uterus, with calculi stopping up the pelvis or ureter, and with cancerous disease of remote parts. In rare instances, no cause by which it could be explained has been detected. Atrophy may be either *general* or *partial*, in respect of the anatomical constituents of the organ. *General atrophy* may affect one or both kidneys: it is characterised merely by the diminution of volume, without any change of structure. It is sometimes found on dissection of cases in which no marked disturbance of the urinary functions was observed during life. *Partial atrophy* of the structure of the kidneys is found chiefly in the advanced stages of chronic cachectic nephritis (§ 87.), when the enlarged Malpighian bodies, and the granular deposits in them, have pressed upon and atrophied the vascular and tubular structures, especially the former. Partial atrophy occurs more rarely without granular deposits, and, in this case, the cortical or vascular tissue is chiefly altered, the bases of the tubular cones almost resting on the fibrous coat of the kidneys, or being separated from it only by a delicate layer of the vascular substance. In some instances, there are evident depressions between the cones, arising from the loss of the vascular structure.

229. *c. Softening* and *Induration* of the kidneys sometimes occur. The former is often accompanied with increased vascularity or congestion. This association may be considered as conclusive evidence of inflammation, particularly when any of the con-

sequent changes described above (§ 38. *et seq.*), as being met with in proper nephritis, is also observed; and is occasionally seen attending calculi in the kidneys, and various chronic alterations of the structure of the bladder, as thickening of its coats, and brownish coloration of its mucous membrane, enlargement of and puriform secretion from its follicles, &c. But softening of the kidneys may exist also independently of increased vascularity, the substance of the organ being remarkably pale, or of a peculiar grey tint. M. Andral has observed this change where there had not been any sign of disease of the urinary passages.

230. *d. Induration*, like softening of the kidney, is attended either by *increased vascularity* or by *diminished vascularity* and blanching of its structure. The former state is generally accompanied with some degree of hypertrophy of the organ. When the induration is of the pale kind, it is rarely attended by enlargement, but commonly by general or partial atrophy. M. Andral remarks that the pale induration presents *two* grades: in the first, the kidney is firmer than usual, but it retains its natural structure; in the second, a more advanced stage of the first, its tissue is so condensed, hard, and white, as nearly to resemble cartilage. This second grade of induration is sometimes partial, or confined to two or three of the tubular cones.

231. v. *Morbid Secretions and Formations* in the substance of the kidney are—1st, *Serum*, contained in small *simple cysts*, with serous parietes, which adhere but slightly to the surrounding tissue, is frequently met with in the cortical structure, and less frequently in the tubular. The serum is generally limpid and colourless, occasionally slightly yellowish or gelatinous. These cysts are frequently numerous, generally small, particularly in the tubular structure, but they are sometimes large in the cortical substance. They are more rarely met with in the cellular tissue surrounding the renal vessels; but they occasionally acquire a very large size in this situation, and cause proportionate wasting of the parenchyma of the organ. When the cysts are thus developed, their cavities are sometimes divided into several compartments by transverse septa. Serous cysts are found in the kidneys after death from various diseases. They are observed after the several forms of nephritis. I have seen them frequently in cases where death was caused by the more chronic diseases of the heart.

232. 2d, *Fatty matter* is sometimes found in the cortical substance of the kidney. M. Andral has observed it, particularly when this substance was pale or yellow, to evidently grease the scalpel. It is connected, he thinks, with a special predisposition in the individual to the secretion of fatty matter. The existence of oil in the blood in considerable quantity, in some cases, particularly when digestion and assimilation are impaired, renders it by no means singular that the secreting structure of organs circulating so much blood through them as the kidneys should become imbued with this substance.

233. 3d, *Purulent matter* is often found in the kidneys. Abscesses sometimes form: occasionally they are very small, and the surrounding structure is scarcely altered; more rarely they are extremely large, the whole organ being converted into a purulent sac, which is generally divided into compartments. This sac may even surpass the size of the kidney so much as to produce a tumour distinguishable through the abdominal parietes. The bulk of this purulent sac is seldom less than that of the kidney, unless it be bound down by adhesions proceeding from inflammation of the adjoining portions of the peritoneum, or be surrounded by a collection of pus in the cellular structure. The septa dividing the compartments of the sac often consist of a hard, lardaceous substance. The matter thus formed in the kidney may pass off by the ureter, or it may find its way in various directions, as explained above (§ 207.).

234. In some instances the purulent matter, instead of existing in the form of a distinct abscess, is infiltrated through the substance of the kidney, giving rise to a number of whitish specks from which it may be squeezed. M. Andral thinks these whitish specks have been mistaken for, and described as, tubercles. This infiltration generally co-exists with purulent formations in other organs, particularly in the veins: I have met with this purulent infiltration of the kidney in a fatal case of puerperal metritis, in which pus had formed in the sinuses of the uterus. M. Andral has observed it after abscess in the right iliac fossa, and a similar case is recorded by M. Gillette. (*Journ. Hebdom.*, t. xi. p. 75.)

235. 4th, *Granular deposits*, and their origin have been described above. They exist in the vascular or cortical structure, and sometimes are found also in this structure where it extends between the tubular cones. They are small whitish bodies of various sizes, somewhat firm, and of a rounded form. In some cases they are few, in others they are very numerous and crowded together, filling and distending the cortical structure, and even occupying the intervals between the cones of the tubular structure. In some instances they project beyond the surface of the organ, and are distinguishable through its fibrous coat. In others they occupy chiefly the more deep-seated parts of the cortical structure.

236. 5th, The deposition of *ossific matter* has been very rarely observed in the kidneys, and then chiefly or only in the fibrous capsules of the organs, and in the arteries of aged persons. Cases are recorded by the older writers, in which portions of the substance of the kidney are said to have been ossified; but they are not detailed with any degree of precision, and cannot be relied on. The external cysts of hydatids are sometimes partially ossified.

237. 6th, *Gelatinous matter* has also been observed in the kidney by MM. Andral and Rayer. This substance resembled a strong gelly of a pale colour, or a solution of starch, into which the whole cortical structure of the organ was transformed. A case occurred to me some years since in a mulatto boy, where this substance existed in one of the kidneys.

238. 7th, *Melanosis* of the kidneys is very rarely met with, and never affecting this organ alone. In the cases where the kidneys were affected by this malady, recorded by Carswell, Fawdington, Petit, Rayer, and Chomel, several other viscera were similarly diseased. (See art. Melanosis.)

239. 8th, *Encephaloid matter* has been found in the kidney, either in small masses, occasioning no alteration of the size or form of the organ, or in considerable tumours, or in the form of *fungus hæmatodes*, and greatly increasing its bulk. Sometimes the kidney is wholly transformed into this substance, and forms a very large tumour, which

may even be felt externally. It has been met with more frequently in young persons than in adults and those advanced in life. This matter may either form in the kidney, without appearing in any other organ, or it may coexist with similar productions in other parts. M. ANDRAL states that it sometimes seems deposited in the substance of the organ, and at other times lodged in its small vessels. It seldom is indicated during life, unless, when in connection with this disease in other parts, a tumour is detected in the region of the kidney, and a considerable quantity of blood is passed in the urine: its existence may be then suspected. Other forms of *cancerous* or *malignant disease* are very rarely found in the kidney, and then chiefly consecutively of its existence in some other part.

240. 9th, *Tubercles* are not often found in the kidneys, and when they are met with in these organs they always exist also in some other viscus, and do not differ from those of the lungs. They may be recognised by their dull white aspect, commonly with a slight greyish yellow tint, by their friability, and by their amorphous appearance under the microscope. They are either distinct or confluent. They sometimes soften, and the softened matter finds its way into the pelvis of the organ, leaving renal caverns or fistulæ. In some cases only a few tubercular germs are observed; in others, and when the degeneration is far advanced, it extends to both the cortical and tubular structures, to the calices and pelvis, and even to the external membranes and ureters. They are often disseminated through the organ in the form of small grains the size of millet seeds. When confluent or grouped, they appear as masses of considerable size, but when the mass is divided it is sure to be composed of a number of smaller tubercles. In some cases, they consist of small compact masses; being the largest tubercles, which are most disposed to soften, and to occasion further disorganisation. The tissue surrounding them may be either sound, or paler than usual, or more vascular. When they soften, the tissue around them is generally injected. In most cases, the organ is not materially increased in bulk by them; in a few it is very considerably augmented. When they form in or beneath the mucous membrane of the calices and pelvis, they are either distinct, rounded, and the size of the head of a pin, or they are grouped. In the former case, they render the surface rugous; in the latter, they produce elevated patches, of variable form and extent.

241. In sixteen cases of tubercles of the kidneys, M. RAYER found them 16 times in the cortical structure, 15 times in the tubular, 13 times in the mucous membrane of the calices, pelvis, and ureters, and twice in the capsules of the organ. He has seen this lesion twice in new-born infants, and considers it rare in aged persons. Of 16 cases, both kidneys were affected in 6; and of the 10 cases of affection of a single organ, the left was 7 times the seat of the disease.

242. The *symptoms* of this change are seldom such as to indicate its existence. It is only when the tubercles soften and open into the pelvis of the organ, that the existence of the disease may be suspected, and then chiefly from the appearance of the matters contained in the urine. The tubercular matter passing with the urine into the bladder generally excites inflammatory action in the mucous surface of this viscus, and the patient's sufferings are usually referred to it, and the original seat of disease thereby masked.

243. 10th, *Hydatids*, or *acephalocystis* (the *Acephalocystis socialis vel prolifera*), are rarely found in the kidneys of men. They are generally numerous or multiplied, and contained in a *mother cyst*, which frequently acquires a large size, forming a tumour which may often be felt externally. They present the same appearance in this organ as described in the article HYDATIDS. The hydatidic cyst is developed in the substance of the organ, and, as it acquires a large size, it generally forms adhesions to the parietes of the calices or pelvis, and opens into the renal cavity by one or more openings, through which the smaller of the hydatids, and the *débris* of the larger, with the serum which they contained, escape with the urine. The expulsion of the hydatids commonly occasions pain in the region of the kidney, and sometimes retention of urine or diminution of it, owing to obstruction of the pelvis or ureter by one or more of them. These retentions, occasional, or repeated, or more or less continued, may ultimately cause dilatation of the ureters and of the pelvis, and various changes in the structures of the organ. The symptoms of hydatids in the kidneys are very equivocal. They frequently occasion but little disturbance until the mother cyst acquires a large size. It is chiefly by their presence, or by their *débris* in the urine, that we can form a correct opinion as to their existence. In one case I thus recognised them: but the patient passed from my observation.

244. 11th, *Worms* are very rarely found in the kidneys. The *Strongylus gigas*, the *Dactylius aculeatus*, and the *Spiroptera hominis*, are the only worms found in this viscus. Their exact situation has not been fully determined. It is probable that they exist only in the pelvis of the organ, although they have been described in general terms as found in the kidneys. M. RAYER has adduced many of the cases of this description on record, and, amongst others, those published by Messrs. LAWRENCE, BURNETT, and CURLING, and to which reference is made in the *Bibliography* to this article.

245. V. MORBID CHANGES IN THE CALICES AND PELVIS, AND IN THE URETERS. The mucous membrane, or rather the submucous tissue of these parts, is often simply congested without any other lesion: and this has sometimes been the only alteration discoverable when the patient has been passing bloody urine, with pain in the region of the kidneys and course of the ureters. In some cases, minute ecchymosis may be observed, in addition to congestion of these parts. This membrane sometimes appears thickened, either in parts or throughout its whole extent, producing temporary, or even permanent obliteration of the ureters. *Vegetations* from this membrane, of a red, soft, fungous appearance, with a broad base, and varying from the size of a pea to that of a small walnut, have also been found in the pelvis of the kidney. M. LOUIS met with a case of great thickening of the walls of the *calices*, *pelvis*, and *ureters*, with increased capacity, the kidneys themselves being reduced to half their ordinary dimensions. The mucous membrane in this situation, as in other parts, often secretes pus, and more frequently without being ulcerated than when this lesion has taken place. M. ANDRAL has seen it covered by a false membrane resembling

that of croup. The submucous tissue of the pelvis and ureters has been, as noticed above (§ 240.), filled with a layer of tuberculous matter; but in such cases this matter has existed also in the substance of the kidneys as well as in the lungs.

246. *Dilatation* of the calices, pelvis, and ureters, sometimes to a remarkable extent, frequently takes place when any obstacle exists to the free passage of the urine into the bladder. The ureters are often greatly dilated in various chronic affections of the uterus, particularly when tumours form in the uterus and press upon the bladder, diminishing its cavity, or obstructing the outlets of the ureters. When the obstacle to the passage of urine along the ureter is situated near the kidney, the portion of this duct below it frequently contracts, and becomes even obliterated. *Ulceration* and *perforation* of the pelvis or ureter sometimes occur, occasioning extra-renal abcess and urinary fistula, as shown above (§ 187.).

247. VI. ALTERATIONS OF THE BLOOD-VESSELS OF THE KIDNEYS.—*A.* The *renal arteries* have been found variously diseased, in rare cases only. Aneurism of the emulgent artery has been recorded in only two or three cases, — by D. NEBELLI (*Ephem. Nat. Curios.*, cent. ix. ob. 59. p. 142.), L. ROUPPE (*Nova Acta Phys. Med.*, t. iv. p. 67. 1770), and M. DOURLIN (*Journ. de Chirurg. et de Méd.*, t. vii. ann. xii. p. 252.). I saw a preparation at the Medical Society of London, many years ago, which appeared to indicate a small aneurism of the emulgent artery. *Cartilaginous* and *ossific deposits* have been found in the renal arteries of very old persons.

248. *B. Inflammation of the emulgent veins* sometimes occurs, generally in connection with some form or other of nephritis. In most of these cases the canal of the vein has been nearly filled with fibrinous or albuminous concretions. M. RAYER observes that he has seen, in several cases of albuminous nephritis, — the cachectic nephritis of the author, — the renal veins filled with fibrinous concretions, and the coats of the vessel thickened. Not only may inflammation of the renal veins be connected with nephritis or structural lesions of the kidneys, but it may be connected in other cases with inflammation of the vena cava or of the ovarian vein. I have seen several cases in which inflammation of the emulgent vein accompanied inflammation of the uterine and ovarian veins in the puerperal state. Similar instances have been observed by Dr. R. LEE, M. DUGÉS, and others.

249. VII. AFFECTIONS OF THE NERVES OF THE KIDNEYS have been noticed by writers, but lesions of the structure of these nerves have not been observed, nor, indeed, can such lesions, although existing to some extent, readily admit of detection. Painful affections, referred to the nerves of the kidney under the term of *Nephralgia*, are generally owing to the irritation of calculi, either in the kidneys or about to pass from the pelvis into the ureter; and is only a different name for what has been called *nephritic colic*, caused by renal calculi. *Nephralgia* may attend calculous pyelitis, as noticed above (§ 184.), or may be merely that grade or state of irritation which occasions a manifestation of morbid sensation in the renal nerves, without inducing, or being attended by, inflammation — the sensible expression of irritation produced by a mechanical cause. *Nephralgia* is sometimes complained of in nervous or hysterical females, and is manifestly owing in them to irritation or excitement of the nerves of the uterus and ovaria, propagated thence to the nerves of the kidneys, in consequence of the intimate connection of the sexual and renal nerves (*see Art.* IRRITATION). That the sensibility of the renal nerves should be morbidly excited in many cases of hysteria is not surprising, when we consider the exaltation of function — the copious secretion of urine — which generally attends uterine excitement and hysteria.

250. *The Treatment of Nephralgia* will entirely depend upon its pathological relations. If it proceeds from calculous irritation, much of what has been advised for pyelitis depending upon this cause, and combining these with narcotic and external derivatives and rubefacients — with the diosma, camphor, henbane, opiates, alkalies, fomentations, warm baths, &c., — may be prescribed. If the nephralgia be *hysterical*, or be connected with uterine irritation, the treatment advised for the other affections of this nature (see HYSTERICAL AFFECTIONS, § 22.) will generally remove it, and attention to the means there recommended, with the view of restoring nervous tone (§ 84.), will prevent the recurrence of this affection.

251. VIII. ABSENCE OF THE KIDNEYS has been noticed by several pathologists. The entire *absence of both kidneys* has been observed in the fœtus by ODHELIUS, BUTTNER, EVERHARD, GILIBERT, HEUERMANN, MAYER, and others. BECLARD remarks that the kidneys are often wanting in acephalous fœtuses, but that one or both exist when the whole or greater part of the spinal chord is present. *Absence of one kidney* has been met with on several occasions. Generally the existing kidney is much larger than usual, and sometimes double its ordinary weight; and it may be either placed naturally, or somewhat too high or too low. In two cases of this description which occurred to M. ANDRAL, one presented the supra-renal capsule of the side on which the kidney was altogether wanting fully developed, proving that the existence of the former does not depend upon that of the latter. The other case was important, inasmuch as the single kidney was in a state of disease, being studded with whitish granulations. The patient was dropsical, evidently from this state of the kidneys, the other internal viscera being sound. Sometimes when one kidney is supposed to be wanting, the other, instead of being in its natural situation, is placed in front of the vertebræ. M. ANDRAL states, that in every case of this description which he had examined, the kidney was only apparently single, being composed of the two united and confounded together at the median line. There may, apparently, be but one kidney, from the circumstance of the other being situated in the hypogastrium beside the bladder. ANDRAL met with a case of this description.

252. IX. THE SITUATION OF THE KIDNEYS may be unnatural, or uncommon. In a few instances they have been found united and placid, in the form of a horse-shoe, *across the spinal column*. Numerous references to cases of this description have been adduced by PLOUCQUET and RAYER. One or both kidneys may be placed much *lower* than usual, and, in very rare instances, they may occupy the pelvis, or its brim: but only one of these organs has been found so low as to occupy the pelvis. Cases of this unnatural position of

one kidney have been referred to by the writers just named. Where this occurs in the female, the uterus is generally more or less displaced by the kidney; and, if the female thus circumstanced becomes pregnant, serious consequences may accrue. Instances of this kind have been recorded by M. Boinet (*Arch. Gen. de Med.*, t. vii. 1835, p. 348.), Dr. Hohl (*Bullet. de* M. Furrusac, t. xvii. p. 3.), and Dr. Heusinger (*Ibid.*, t. xv. p. 131.).

253. One or both kidneys—one especially—may be *displaced* by the pressure of an enlarged viscus, or by a tumour, abscess, or other cause. The displacement may be even so great as to constitute a hernia of the organ, as in the cases recorded by Haller, Monro, and Portal. One or both kidneys may also be more or less *moveable*, owing to the state of the tissues surrounding and connected with them, and to structural lesions of their substance—especially calculi and abscesses. Generally, however, lesions of the organ itself are but little concerned in giving rise to its *mobility*, either in a vertical or horizontal direction, although insisted upon by Riolan. Instances of this lesion have been noticed by Velpeau, Gerdy, and Rayer; and several of them are detailed by the last-named writer.

254. The *symptoms* in these cases consisted chiefly of pains in the abdomen or loins and corresponding thigh; of hypochondriacal and colicky affections; of weakness or neuralgic pains of the limb, and sometimes of œdema of the thigh, or a moveable tumour detected in the abdomen. Most of the instances on record occurred in females; and the right kidney was almost exclusvely thus affected. They appeared to arise from enlargement of the liver, distension of the cæcum, frequent pregnancies, muscular efforts, &c.; and, in some of them, peculiar dispositions of the peritoneum and of the blood-vessels of the organ were remarked. M. Rayer alludes to two physicians whose right kidneys were thus moveable.

255. In cases of this description the patient should wear a suitable belt or support, as being the principal means of preventing, as well as of removing, the pains and other symptoms caused by this lesion. In some instances, the cold or tepid douche on the loins, and the horizontal position, may be advantageously recommended.

Bibliog. and Refer. — *Aristoteles*, De Genr. Animal. lib. iv. c. 4. — *Celsus*, Lib. iv. c. 10.—*Galenus*, De Ren. Affect. Op. lib. vi.—*Aretæus*, Curat. Acut. lib. ii. c. 8.—Chron. lib. ii. c. 3.—*Plinius*, Lib. xxviii. c. 13. —*Aëtius*, Tetrab. iii. serm. iii. c. 16. 18. 26. — *Alexander Trallianus*, Lib. iii. c. 35. — *Paulus Ægineta*, Lib. iii. c. 45. — *Oribasius*, Synopsis, lib. ix. c. 25. 27. — *Avicenna*, Canon. lib. iii. fen. 18. fr. 2. c. 10. — *H. Augenius*, De Medendis Calculosis et Exulceratis Renibus. Camerini, 1575. — *Coluti*, De quærelis Nephrit. et Renum Calculo. 4to. Rome, 1624. — *C. Artomius*, De Gravissimo Renum Affectu Calculosa. 4to. Basil, 1618.—*Holler*, De Morbis Internis, lib. i. c. 47. —*A. Clutius*, Lapidis Nephritici Natura, Propriet., Operat., &c. 12mo. Rost. 1627.—*Doering*, Epist. de Calculo Renum ejusque Sectione. 4to. Ulm, 1628.—*Amatus Lusitanus*, Cent. ii. 61.; v. 100.; vi. 14. —*Sennert*, Med. Pract. lib. iii. p. 7. sect. i. c. 7.—*J. Tilemann*, De Natura et Curatione Doloris Nephritici. 8vo. Marb. 1644. — *Zacutus Lusitanus*, Med. Pr. Hist. t. i. lib. ii. no. 127.; l. ii. no. 140. — *Bartholinus*, Hist. Anat. cent. ii. no. 60. — et De Lapide Nephritico Opusculum. 8vo. Hafniæ. 1627.—*Blancard*, Anat. Pract. Rat. cent. i. obs. 45.— *L. Beverovicius*, De Calculo Renum et Vesicæ Liber Sing., &c. 18mo. Lugd. Batav. 1638.—*Tyson*, Philos. Trans. no. 142. — *G. Rolfinck*, De Calcul. in Corpore Humana, præcipuè Renibus et Vesica, is Generat. Signis, Remedico. 4to. Genæ, 1663. — *J. Boscius*, De Lapidibus qui nascuntur in Corpore Humano præcipuè Renibus ac Vesica, et ipsorum Curatione. 4to. Ingolst. 1680.— *Berber*, Dissertation sur les Ulcères des Reins et de la Vessie. 12mo. Dijon, 1685. — *G. E. Stahl*, De Nova Patholog. Calculi Renum. 4to. Hallæ, 1698. —*W. Rutty*, Treat. of the Urinary Passages, with the principal Distempers that affect them, particularly Stone of the Kidneys and Bladder. 4to. Lond. 1726. — *Baglivi*, Opera Pract. Med. lib. i. p. 118. — *S. Olivier*, Traité des Maladies des Reins et de la Vessie, &c. 8vo. Rouen, 1731. — *J. Douglas*, in Med. Essays and Observat., &c. vol. i. p. 231. — *Stoerck*, Annus Med. ii. p. 256. — *G. A. Bilian*, De Calculo Renum. 4to. Wittemb. 1750. — *C. T. Trew*, in Ephemerides Acad. Naturæ Curiosorum, t. iv. p. 539. — *J. S. Carl*, in Ibid. t. vii. p. 205. — *W. Adams*, Disquisit. on the Stone and other Dis. of the Kidneys, Bladder, &c. 8vo. Lond. 1775. — *Petit*, Traité des Malad. Chirurg. iii. p. 8.— *J. Clarke*, in *Duncan's* Med. Commentaries, &c. vol. vi. p. 204. — *W. Keir*, in Medical Communications, &c. vol. i. p. 127.— *H Fearon*, in Ibid. p. 416.— *Bonet*, Sepulchret. lib. iii. sect. 21. obs. 8., sect. 22. obs. 4. 23.; lib. iv. sect. i. 38. — *Douglas*, in Philos. Trans. no. 325 — *Roederer*, Observ. ex Cadaveribus Infantum Morbosis. Goet. 1758.—*Morgagni*, Epist. xl. art. 12. 18.; xlii. art. 13. 20. 28.; xlvii. art. 16. — *Haller*, in Nov. Comment. Goetting. t. viii. no. 8. — et Element. Physiol. t. vii. p. 242.— *Monro*, Observ. on Crural Hernia, &c. — *J. A. Murray*, Comment. de Arbuto Uva-ursi, p. 164. Goet. 1765. — *Bang*, in Acta Reg. Soc. Med. Haun. vol. i. p. 301.; vol. iv. p. 171. — *Wichmann*, Ideen zur Diagnostick. b. iii. p. 6. — *Sandifort*, Exercit. Acad. lib. ii. c. 11. —et Anat. Pathol. lib. iii. p. 96.—et Museum Anatom. lib. i. p. 251.—*Zeviani*, in Memorie di Verona, t. v. p. 391.—*De Haen*, Ratio Medendi, p. ix. c. 1.—et Opuscul. Inedit. p. i. no. 20. — *Wiseman*, Chirurg. Treatises, &c. vol. ii. — *M. Stoll*, Rat. Medendi, p. vii. p. 360. — *Hallé*, in Hist. de la Soc. Roy. de Méd. ad. 1781-82. — *Walter*, in Nouv. Mémoires de l'Académie à Berlin, 1790-91, p. 106. —Anat. Museum, vol. i. p. 165. — *A. M. Cova*, De Renum Calculo, ejusdemque cum aliis Morbis similitudine. 8vo. Ticini, 1790. — *W. Falconer*, Of the Efficacy of Aqua Mephitica Alkalina in Calculous Disorders. 8vo. Lond. 1799, 3d ed. — *Dupont*, in Journ. de Med. tom. xxxii. p. 135. — *T. A. Walter*, Einige Krankheiten der Nieren, &c. 4to. Berlin, 1800. — *Carter*, in Med. Facts and Observat. vol. vi. art. 3.—*R. Willan*, in Ibid. vol. iii. p. 1.; Ibid. vol. vii. p. 285. —*Pole*, in Mem. of Med. Soc. of Lond. vol. ii. no. 39. — *S. Lowdell*, in Ibid. vol. i. p. 319. — *Erratt*, in Ibid. vol. v. art. 6. — *P. Copland*, in Ibid. vol. v. p. 71.; vol. vi. p. 601. — *J. P. Frank*, De Cur. Hom. Morbis, lib. ii. p. 294., et lib. vi. par. i. p. 283. — et Acta Institut. Clinic. Vilnensis, ann. iii. p. 83. — *Caldani*, Memorie di Fisica della Società Italiana a Modena, tom. ii. p. 2. —*Hohnstock*, Die Magen- und Nieren-Entzündung, &c. 8vo. Sonders. 1808. — *Horn*, Archiv für Pr. Medicin. b. vi. p. 337. — *Völker*, in Ibid. July, 1812, pp. 133. 138. — *M. Baillie*, Series of Engravings, &c. fasc. vi. 4, 5, 6. 8. — *G Blane*, Trans. of Society for Improv. Med. and Chirurg. Knowledge, vol. ii. — *Conradi*, in *Arnemann* Magazin, b. i. p. 179. —*Portal*, Cours d'Anat. Méd. tom. v. p. 378.; et p. 390. — *Rudolphi*, Bemerkungen, &c. th. ii. p. 190. — *Frank*, Interpret. Clinic. i. p. 242. 261. — *Pearson*, in Med. Observat. and Inquiries, vol. vii. —*Schmidtmann*, in *Hufeland*, Journ. der Pr. Arzneyk. b. vii. st. 4. p. 44. — *Chopart*, Traité de Malad. des Voies Urinaires, &c. edit. *Felix Pascal*, 2 tomes. 8vo. Paris, 1830. — *J. Wilson*, Lectures on the Struct. and Physiol. of the Urinary Organs, and on the Nature and Treatment of their Diseases. 8vo. Lond. 1821.—*J. Howship*, Pract. Treat. on some of the most Important Complaints that affect the Secretion and Excretion of Urine. 8vo. Lond. 1823. — *A. Marcet*, in Trans. of Med. and Chirurg. Society of London, vol. x. p. 147. —*H. Earle*, in Ibid. vol. xi. p. 211. —*V. De Lafosse*, in Nouv. Biblioth. Médicale, tom. viii. p. 43.—*K. Caspari*, Der Stein der Nieren, &c. 8vo. Leipsic, 1823.— *Julia*, in Archives Génér. de Médecine, tom. ii. p. 577.; tom. xviii. p. 124.—*Dance*, in Ibid. tom. xxix. p. 149. — *Boisseau*, Nosographie Organique, &c. tom. iii. p. 350. — *P. Copland*, in Edin. Med. and Surg. Journ. vol. vii. p. 38. — *Abercrombic*, Ibid. vol. xvii. p. 210. — *W. Howison*, in Ibid. vol xviii. p. 557.— *R. Robinson*, in Ibid. vol. xix. p. 33. — *J. C. Gregory*, in Ibid. vol. xxxvi. p. 315.; et vol. xxxvii. p. 54. — *Craigie*, in Ibid. vol. xli. p. 120.— *J. Fosbrooke*, Pract. Observat. on the Patholog. Relat. between the Kidneys and other Organs. 8vo. Chelt. 1825. — *Hevin*, in Mém. de l'Academie Roy. de Chirurg. tom iii. p. 262. — *F. Smith*, in Lond. Med. Gazette, vol. vii. p. 138. — *Graves*, in Ibid. vol. vii. p. 585. — *B. C. Brodie*, in Ibid. vol. viii. *passim*.— *R. Bright*, Reports of Medical Cases, illustrating the Symptoms and Cure of Disease, &c. p. 1. *et seq*. 4to. Lond. 1827, —and in *Guy's* Hospital Reports, vol. i. p. 380. —and *Johnson's* Med. Chirurg. Rev. July, 1836, p. 193. — *J. Lauder*, Trans. of Med. and Phys. Soc. of Calcutta, vol. vii. p. 473. — *Gluge*, in Brit. and For. Med. Rev., April, 1838, p. 556. — *R. Christison*, On Granular Degeneration of the Kidneys. 8vo. ed. 1838.—*W. England*, Observat. on the Functional Diseases of the Kidneys, &c. 8vo. Lond. 1830.—*Graves*, in Dubl. Journ. of Med. Sciences, no. xvi.—*B. C. Brodie*, Lectures on the Diseases of the Urinary Organs. 8vo. Lond. 1832.—*Carter*, Cyclop. of Pract. Med. vol. iii. p. 6. 161.—*J. G. Crose*, A Treatise on the Formation, Constituents, and Extraction of the Urinary Calculus, &c. 4to., plates. Lond. 1835.—*R. Willis*, Urinary Diseases and their Treatment. 8vo. Lond. 1838.—*W. Coulson*, On Diseases of the Bladder and Prostate Gland, &c. 8vo. Lond. 1840.—*W. Prout*, On the Nature and Treatment of Stomach and Urinary Diseases, &c. 8vo. Lond. 1840, *passim*.—*Martin Solon*, De l'Albuminurie ou Hydropisie causée par Maladie des Reins, &c. 8vo. Paris, 1838.—*P. Rayer*, Traité des Maladies des Reins, et des Alterations de la Secretion Urinaire, &c. 3 tomes. 8vo. Paris, 1838—1841. (See also *References and Bibliography* to articles on URINE and URINARY BLADDER.)

LACTATION.—*Lactatus, Lactatio.* Γαλουχια. *Lactation, allaitement*, Fr. *Säugung*, Germ. *Allatamento*, Ital. (*Suckling*).

CLASSIF.—GENERAL PATHOLOGY.—SPECIAL PATHOLOGY.— III. CLASS, I. ORDER (*Author*.)

1. DEFIN.—*The function of secreting and excreting milk.*

2. It is justly observed by Dr. LOCOCK, that lactation in the human female, when naturally conducted, cannot be called a disease; but even under the most favourable aspect there are often circumstances which require attention and regulation, for the purposes both of alleviating pain and of preventing mischief. There are, also, frequent interruptions to this usually healthy process, and so many important questions connected with it, at various periods, that it becomes necessary to notice them, although briefly.

3. The intimate sympathy between the mammæ and the uterus is evident even in the unimpregnated state. This is observed in connection with menstruation, and in some diseases of the womb. In pregnancy the alteration in the breasts is well-marked, and the quantity of milky serum secreted is sometimes very great, particularly towards the close of utero-gestation. Many women, however, have no appearance of milk before delivery, and yet have an abundance afterwards.

4. I. SLIGHTER DISORDERS OF LACTATION.—*a.* After parturition, the infant is usually applied to the breast, as soon as the exhaustion more immediately consequent upon this process is partially removed, or generally within the first twenty-four hours, in order to draw out and form the nipple, before the breasts become hard or distended, and to encourage the flow of milk. There is seldom any quantity of milk secreted, with first children, before the third day; but about that day, or one or two later, the breasts become swollen and hard, and often hot and painful; the pulse is accelerated; and slight chills, febrile commotion, thirst, disturbed sleep, and occasionally slight disturbance of the sensorium, supervene. This constitutional excitement attending the establishment of the function of lactation continues until the milk is at its height, as it is termed: the breasts are then extremely hard, knotted, loaded, and tender. The swelling may extend to the clavicles and axilla, the glands in this latter situation being also enlarged; but a small quantity of milk will ooze out from the nipples, especially if the breasts be fomented or gently pressed. The act of suckling the infant is attended by great pain in the breast, but it is followed by relief; and as the milk flows, the hardness and swelling are diminished. After some hours, if the milk be freely drawn off, the sensations become more comfortable, and the process of lactation is duly established.

5. *b.* The above state of local and general disturbance ushering in this process may vary in grade from that described; but, when it is at all considerable, means should be used to alleviate it. As soon as the febrile symptoms begin, a cooling saline purgative should be given, and repeated in twelve or twenty-four hours, according to circumstances. In order to allay thirst, and to prevent the distension of the breasts which copious draughts would occasion, cooling saline diaphoretics, or effervescing draughts, ought to be prescribed. When the infant cannot draw out the nipple of a hard or distended breast, or obtain the thick milk distending the ducts, an older child may be applied, or a grown person should do this, or have recourse to artificial means, such as the breast-pump, &c. Natural or artificial suction, fomenting the breasts with hot water, warm poultices, &c., generally relieve the local disorder, and promote a free discharge of milk.

6. *c.* The milk first drawn contains a considerable quantity of what has been called *colostrum*, and has a purgative quality, thus serving to evacuate the meconium which loads the large intestines. When, therefore, the infant does not get the first draught of the breast, from being suckled by a wet-nurse, or from being brought up by hand, a gentle purgative should be given to it; as diarrhœa or convulsions may arise from the retained meconium. In other circumstances, the exhibition of a purgative may be superfluous; for, as Dr. R. LEE has shown, a quantity of highly nutritious albumen is found in the small intestines above the situation of the excrementitial meconium, serving for the sustenance of the infant until lactation is fully established. A purgative, therefore, given before this process is fully commenced will carry off this substance.

7. *d.* The milk varies much in its properties, and even in its sensible qualities and appearance, during the usual period of lactation, according to the diet, modes of living, state of mind, and bodily health of the nurse. At first the milk is thick, yellowish, and abounds with cream: but, after a few days, it assumes the usual appearance, and becomes thin, bluish, and sweet. The taste and qualities of the milk are altered by several articles of diet, by repletion, hot and close rooms, by medicines, and moral emotions, particularly those of a violent kind; and the infant is more or less affected by the alteration. The milk may be so disordered as to have a saline, a bitter, or an otherwise unpleasant taste, the infant relinquishing the breast instantly upon tasting it. So remarkable an influence may medicines have upon the milk, and through it upon the child, that a purgative taken by the nurse may affect the former, without materially affecting the latter. Alkalies, mercury, various alteratives, and saline substances, often act in a similar way. The colour of milk may be changed somewhat, owing to an admixture of a little blood with it from the exterior or interior of the nipple. It is not infrequently altered by biliary disorders of the nurse. Dr. LOCOCK has seen four instances where it was of a golden yellow hue, and where, upon standing, a thick layer of bitter cream, as yellow as pure bile, floated on its surface. In neither of these cases

was the nurse jaundiced; but, a very copious flow of bile being procured from the intestines by mercurial purges, the yellowness gradually disappeared; the child till then having been much griped and affected with diarrhœa. Yet in no cases where the wet-nurses have been jaundiced has Dr. LOCOCK seen the milk yellow; and it is not uncommon for them to become thus disordered, owing to a sudden transition from a scanty diet, to a full and luxurious mode of living. Milk may disorder the infant from merely being too rich. The remedy in this case is to purge the nurse, to cause her to take active exercise, and to abridge her diet.

8. *e.* The properties of the milk are altered more or less by *menstruation* and *pregnancy*. Menstruation generally impairs both the quality and the duration of the milk. The infant often brings up the milk, becomes fretful and disordered in the bowels, the stools being watery, frequent, or of a spinach-colour. When this form of disorder occurs, menstruation in the nurse should be suspected. The *pregnancy* of the nurse may not only cause the milk to be scanty, watery, &c., but may also variously disorder the infant. It is supposed by many that suckling will prevent impregnation; and, owing to this notion, lactation is often continued for much too long a period, as respects the health both of the infant and of the nurse; but women very frequently do become pregnant when suckling, whilst some do not. Mr. ROBERTON found that, in 160 cases, 81 had become pregnant once or oftener during this process. Dr. LOCOCK is decidedly of opinion that those women who menstruate during lactation will more readily conceive than those who do not; and he has also remarked, as Dr. HAMILTON has done, that both these occurrences are more common with first children: hence women under these circumstances are not, *cæteris paribus*, so eligible as others for wet-nurses.

9. II. MILK FEVER.—*a.* This disorder is a morbidly aggravated form of the local and general excitement attending the commencement of lactation, and noticed above (§ 4.). The febrile symptoms are much more severe than in it, and are ushered in by chills or a marked rigor. There are severe pains and throbbing in the head, flushed face, intolerance of light and sound; excessive thirst, a hot and dry skin; a rapid, full or hard pulse, furred or loaded tongue, costive bowels, scanty or high-coloured urine, and sometimes a diminution of the lochia.

10. These attacks are commonly *caused* by a stimulating diet, a heated or close apartment; by over-exertion, disturbance, or mental agitation; and exciting beverages. They were frequent occurrences, when brandy caudle, large fires, imperfect ventilation, and loads of bed-clothes, were generally adopted; and were often followed by inflammatory fevers, phrenitis, &c.

11. *b.* The *treatment* of this disorder is very manifest: cooling saline purgatives, cooling diaphoretics, due ventilation, and a moderate temperature of the apartment; the encouraging of a copious flow of milk, and the avoiding of mental emotions and excitement of the senses, are the most influential means of cure: and generally produce a remission of the symptoms in the course of a few hours, and a copious perspiration. If, however, injudicious means be employed, and either the milk or the lochia, or both, be suppressed, very dangerous disease will supervene, and copious depletions will be requisite, with other remedies appropriate to the nature of the consequent mischief.

12. III. EXCESSIVE SECRETION OF MILK.—*a.* The secretion of milk may be excessive in *reality*, or only *apparently*. The former exists when the quantity secreted and excreted is inordinate, the breasts being distended, painful and knotted, although the discharge from them is free or even very copious: the latter obtains chiefly where there is deficient power of retaining the milk, a constant discharge taking place in the intervals between suckling. In most, however, of such cases, the quantity secreted is really augmented. In connection with this excessive secretion, there is generally more or less constitutional disorder; for, as in the first instance, if the breasts be much swollen and painful, a species of chronic milk fever may attend this excessive function: and, ultimately in such cases, as well as in those characterised by deficient powers of retaining the milk, the frame of the nurse is exhausted by the inordinate discharge, and by the diversion of the nourishment from herself. In such circumstances, similar disorders to those observed in females who have suckled too long, or in those who are constitutionally, or from previous health, incapable of suckling at all, soon manifest themselves, and the nurse sinks into a state of marasmus, or of hectic or of chronic debility, or becomes consumptive, or complains of dragging pains and weakness in the back or loins, &c., or presents the state occasioned by prolonged lactation about to be noticed.

13. *b.* The *treatment* in these states of disordered lactation should depend much upon the form which it assumes, and the effects it has produced on the general health. In the *first form* (§ 12.), or when the secretion is very excessive, the breasts being swollen, hard, and tender, and the health not materially impaired, cooling diaphoretics, saline aperients, refringents, low or moderate diet, and avoiding sexual indulgence, are the most appropriate means. In the *second form* (§ 12.), or when there is an insufficient power of retention, it has been proposed to have recourse to topical astringents, as lotions of alum, zinc, &c.; but these are apt entirely to suppress the secretion of milk. Others again have advised the internal use of astringent tonics and the mineral acids; but these remedies frequently disorder the bowels of the infant. The preparations of steel, or of cinchona, or other vegetable tonics, the shower-bath, or cold salt-water bathing, and a cool state of the breasts, are the most beneficial remedies.

14. IV. UNDUE LACTATION.—Lactation may be undue or improper as respects — 1st, The state of the nurse's constitution or existing state of health; and, 2d, The lengthened continuance of it. — Females of a nervous susceptible temperament, and weakened constitution; those who are predisposed to pulmonary consumption, to puerperal mania, or to insanity in any form; and those who have been chlorotic and very hysterical before marriage, frequently are incapable of suckling for any considerable time, without exhibiting indications of its injurious effects upon their constitutions, and even upon the infant also. These effects are usually the same as those which follow a too protracted period of lactation.

15. *a.* The *duration* of suckling should have strict reference to the health of the nurse and the state of the infant. Many begin, and continue to suckle for some time, with great success; but, owing to disturbed rest, insufficient food, and too frequent or too prolonged applications of the infant to the breast, the health of both nurse and infant ultimately suffers. Where lactation is judiciously regulated, and the health of the nurse is not impaired thereby — whilst strength and nourishment are preserved by a suitable quantity of food and drink, and rest is not prevented by too frequent applications to the breast, — the period may be protracted without injury to either the nurse or infant. But if the nurse menstruates, or becomes pregnant, the period should be terminated forthwith, such provision being made for the nourishment of the infant as its age, state of health, and its progress in the process of teething, will warrant.

16. *b.* The *symptoms* of undue lactation are such as naturally result from a protracted discharge or drain, beyond the assimilating powers and strength of the nurse. When the infant is at the breast, or a short time after its application, she feels a sense of dragging in the back or loins, and of sinking at the sternum and pit of the stomach, with a feeling of emptiness, which continues for some time. After these have been felt for a time, the appetite fails gradually; general lassitude is complained of; the pulse becomes quick and feeble; alternate chills and flushes of heat come on; and the spirits sink, or are irritable or weak. Subsequently emaciation, costiveness, head-ache, weakness of sight, loss of memory, thirst, dry tongue at night, and night perspirations, supervene; and in some cases pulmonary consumption, in others symptoms closely simulating consumption, or a chlorotic or anæmic appearance of the surface, leucorrhœa, neuralgic pains in various situations, or pleurodynia, and not infrequently that form of puerperal mania which I have described (see INSANITY, § 534.) as occasionally following undue lactation, are thus caused.

17. *c.* The *treatment* should consist of the immediate removal of the cause of the disorder. The infant should be weaned, and those disorders, if they have not made too great a progress, or gone on to organic lesion, will generally disappear before appropriate remedies. But unless lactation be terminated, such remedies will often fail of being serviceable. This having been done, or being in progress, vegetable tonics, the compound steel mixture or the acetate or other preparations of iron, cold or sea-bathing, the shower-bath, change of air, and light nourishing food, in conjunction with such other means as the form of disorder thus caused will suggest, will generally restore the patient to health.

18. V. SUPPRESSION OF THE MILK.—The milk may be suppressed, or suddenly disappear from the breasts, at any period of lactation, but more readily very soon after delivery. The suppression may be *total,* or only *partial;* and it may be *primary,* or *consecutive.*—*a.* It may be considered as *primary* when milk does not appear at all in the breasts after delivery, and *consecutive* when a *total* or *partial* suppression follows the establishment of the process of lactation. The *non-appearance* of milk in the breasts is generally owing to some fault in the organization, or in the nervous energy of these glands; to want of constitutional power, or of necessary nourishment; to excessive discharges, whether hæmorrhagic, lochial, or leucorrhœal; to the occurrence of acute or inflammatory diseases; to the pre-existence of organic maladies; to mental distress and anxiety; to cold applications and astringents to the breast; and to various circumstances peculiar to individual cases. Frequently, instead of a total suppression, or *non-appearance* of milk in the breasts, there is merely an *insufficient secretion* — the quantity being much below that which is requisite to the health and growth of the infant.

19. *b.* The *consecutive suppression* of milk is generally owing to fear, sudden terror or fright, anxiety of mind, unpleasant news suddenly or unexpectedly communicated, grief, all the depressing passions and emotions, startling noises, disappointment, vexation, anger, &c. It may be occasioned also by severe attacks of disease, or by any of the causes enumerated above (§ 18.). Whilst the suppression of the lacteal secretion may proceed from the developement of inflammatory or other acute diseases, these latter may also arise from the suppression of milk caused by mental emotion, or by other occurrences. In the former case, it may be considered that the inflammation or sanguineous afflux, constituting these diseases, creates a diversion of the vital current from that quarter where it is necessary for the continuance of the lacteal secretion: in the latter case, either the passage of the milk from the breast into the mass of blood, or the accumulation in it of the constituents requisite to the formation of this fluid, creates such a state of vascular plethora, or affects the blood in such a manner as readily to kindle inflammation, or cause congestion, effusion of serum, or other changes in organs disposed to such maladies either by original conformation or by an acquired predisposition. Dr. LOCOCK states — and even more remarkable facts of a similar kind have been recorded by numerous writers of high character — that he has observed, when bleeding has been had recourse to in inflammatory diseases, with sudden suppression of milk, that the serum of the blood, when separated by rest, has been white, opaque, and bearing nearly all the characters of milk, excepting the formation of cream on its surface. It may also be observed, that, when the milk has been driven back by active purgatives, a large quantity of milk-like fluid may be seen in the motions. However, a milky state of the serum of the blood often attends the puerperal states, independently of any suppression of milk; and I have seen, in several cases, some years ago, in Queen Charlotte's Lying-in Hospital, the serum effused in the peritoneal cavity, in fatal cases of complicated puerperal fever, present a milk-like appearance, with clots like the curds of milk; and yet the secretion of milk was not suppressed during the disease. The same appearances have also been observed in cases where a suppression of the milk had occurred.

20. In rare instances, when the milk is suppressed, a vicarious discharge of it, or of a fluid very closely resembling it, takes place from various situations: this has been termed a *translation* of the milk, and in many of such instances the general health has not materially suffered. The situations where this vicarious discharge has occurred are, the mucous surface of the intestines;

of the womb or vagina, in the form of leucorrhœa; the fauces and throat, the kidneys, &c.

21. *c*. The *treatment*, in cases of the non-appearance or of the suppression of the milk must depend upon the *causes* producing it, the *extent* to which it has been carried, and upon the *effects* it has occasioned. When it is desirable to restore the secretion, the infant should be kept to the breast, or the breasts ought to be regularly drawn; and, if the suppression be partial, or owing to insufficient nourishment, the removal of this cause will generally be sufficient to restore the secretion. Some females have an insufficient, and watery, or thin supply of milk, owing to the use of too much fluid, as weak tea, &c., and to a poor vegetable or watery diet, and living in low damp situations and dwellings. A due supply of light animal food, of richer beverages, and living in a dry pure air, will restore to these the healthy secretion of milk. If inflammatory or other diseases have resulted from the non-appearance or suppression of the milk, the treatment will necessarily depend upon the nature and character of such disease; keeping, however, in recollection, this particular circumstance connected with their production.

22. There are two facts connected with the non-appearance or suppression of the milk which should not be overlooked. Some women dissemble, and wish to make it appear that they have no milk, or an insufficiency of milk, in order that they may avoid suckling. A few of these may have a fear of its effects upon their own health; but much more frequently they dissemble with a view of avoiding the trouble and confinement connected with suckling, and of preserving the form of their breasts. Hired nurses, on the other hand, often pretend that their milk is abundant and healthy, when it is neither the one nor the other; or even when it is nearly gone. When the milk is gone, and when, in most instances, it cannot be restored, it will be found that the breasts do not swell nor become firm after a considerable time from the last period at which the infant was applied to them. The infant seems hungry, even upon quitting the breast; and is constantly seeking to be applied, but quits the nipple, after having taken it for a very short time, with impatience and with distressing cries. It passes very little urine, it sleeps little, and is rapidly emaciated.

23. VI. The Termination of the Period of Lactation becomes necessary when the infant is sufficiently old to be fed by many of the usual articles of diet, when it is from eight or nine to fifteen months old, and when it has four or six teeth, or more. But there are other circumstances which indicate the propriety of terminating the period of lactation, before it be prolonged to the term now named, and to which attention is more especially directed above (§ 16.). Where these exist, or when the child is dead, the secretion of milk should be gradually suppressed. A sudden suppression of this function might endanger the occurrence of phrenitis, of fever, or of internal inflammations. The safest means of accomplishing this end, are the exhibition of saline purgatives, and of refrigerants, a low and cooling diet, and a sparing use of fluids. If the breasts become hard or painful, a small quantity of milk may be drawn off, and stimulating liniments may be applied to them. They should also be rubbed gently with warm oil. After a few days, but little inconvenience will be felt, and in a few more, the milk will have entirely disappeared.

24. *In weaning* an infant, however, the gradual withdrawal of it from the breast, and the partial feeding it for some time previously to complete weaning, generally favours the dispersion or suppression of the milk, and prevents much disorder or inconvenience being felt from the cessation of this function. Still the bowels ought to be kept very freely open, and purgatives should be given from time to time, or according to circumstances, otherwise loss of health, depression of spirits, disorder of the digestive organs, or some specific disease, to which a predisposition may exist, may supervene. (*See also, connected with this subject, the article* Mamma.)

Bibliog. and Refer. — *Sainte-Marthe*, Manière de nourir les Enfans à Mamelle. 8vo. Paris, 1698. — *J. Colbatch*, Of the Art of Nursing. 8vo. Lond. 1733. — *A. Levret*, Lettre sur l'Allaitement des Enfans. 8vo. Paris, 1771. — *H. Smith*, Letters to Married Women on Nursing. 8vo. Lond. 1774. — *F. Baldini*, Il Metodo di allatare i Bambini. 8vo. Nap. 1784. — *R. De Lepinoy*, Avis aux Mères qui veulent allaiter leurs Enfans. 8vo. Paris, 1785. — *B. Lara*, An Essay on the injurious Custom of Mothers not suckling their Children. 8vo. Lond. 1792. — *G. A. Chevalier-Demolle*, Consider. Méd. sur les Avantages de l'Allaitement étranger pour les Enfans des grands Villes. 8vo. Paris, 1803. — *L. J. Boer*, Ueber die Saügung Neugebohrner Kinder. 8vo. Wien, 1808. — *Dawborn*, The Rights of Infants: a Letter on Nursing. 8vo. Lond. 1805. — *F. Von Leuthner*, Abhandlung ueber die Vernachlassigte Saügung bey Müttern. 8vo. Nurn. 1810. — *Gardien*, Dict. des Sc. Med. t. i. — *Desormeaux*, Dict. de Médecine, t. ii. p. 2. et t. xii. — *Lachaise*, Revue Médicale, t. iii. p. 472. 1825. — *Dugés*, Dict. de Méd. Prat., t. ii. — *W. C. Dendy*, Book of the Nursery. 8vo. Lond. 1833. — *T. Bull*, Hints to Mothers during Pregnancy, &c. 12mo. Lond. 1839. — *Locock*, Cyclop. of Pract. Med., vol. iii. p. 9. — *A. Combe*, A Treatise on the Physiological and Moral Management of Infancy, p. 187. 12mo. Edin. 1840.

LARYNX AND TRACHEA. — Synon. Λαρυγξ, *Larynx*. *Luftröhrenkopf*, Germ. *Larynx*, Fr. *Laringe*, Ital. — *Trachea*. *Die Luftröhre*, Germ. *Trachée*, Fr. *Trachea*, Ital. *Windpipe*.

1. I comprise under this head those affections which more especially interest the functions and organization of the *larynx*, *epiglottis*, *and trachea*. Those disorders which are *sympathetic*, *nervous*, or *functional*, are *first* considered; and those diseases which are *inflammatory*, and are *consequent upon inflammation*, are *next* discussed. The *physiology* and *connections* of this part of the respiratory apparatus should be constantly kept in view when we discuss the causes, symptoms, nature, and treatment of its diseases. The circumstances of its being the portal through which air passes into and out of the lungs, and the chief part of the organ of voice or of human sounds, during the passage of this fluid from the lungs; the exquisite sensibility with which it is endowed rendering it capable of preventing injurious matters of every grade of fluidity or consistency from entering into an organ which more immediately than any other interests the life of the individual; its intimate connection with the parts concerned in the process of deglutition, and the protection it receives from the epiglottis, cannot fail of suggesting important considerations respecting the relations, consequences, and treatment of its disorders.

2. I. Nervous, Functional, or Sympathetic Affections of the Larynx. — As the exact extent of function of the larynx has not been fully understood until recently, so the nature and con-

nections of the disorders of this organ have been very imperfectly known, and several of these disorders have been confounded with one another, or been referred to pathological conditions from which they are altogether distinct and alien. Several of the sympathetic affections of the larynx hardly differ from each other in their phenomena, particularly as regards the disorder of the function of respiration, and yet they proceed from very different or even opposite pathological states: and some of these states do not admit of recognition during life. Others, again, may be distinguished from one another, as respects both their individual characters and their morbid relations. It becomes, therefore, a work of interest, but of no small labour, to point out those distinctions which actually exist between some, as well as the relations that subsist between others of these affections; and the difficulty of doing this is much increased by the circumstance of the same names having been applied by several writers to very different morbid conditions; and, in some instances, from one name having been made to comprise more than one distinct form of disorder. This confusion has arisen from writers having described these disorders partly from the recollection of a few ill-observed phenomena, and partly from imperfect descriptions contained in books. Thus the affection which was correctly denominated "*Spasmodic Croup*" by Wichmann, Michaelis, and Double, and the "*Acute Asthma of Infants*," by Simpson and Millar, and which I have described as a species of croup characterised by predominance of spasmodic or nervous symptoms, in connection with signs of inflammatory or catarrhal irritation in the respiratory passages, has been confounded with the *stridulous respiration with laryngic suffocation*, which arises from a variety of pathological states, which is entirely unconnected with any affection of the respiratory passages, and which is very distinct from true *spasmodic croup*, which is always attended by signs of inflammatory, bronchial, or catarrhal irritation, as shown in the article Croup (§ 14. *et seq.*). Again, to the affection which is characterised by stridulous respiration with laryngic suffocation, and which is aptly enough termed "*Laryngismus stridulus*," Dr. Good applies, with practical ignorance of the disorder, the description truly belonging to the *spasmodic croup* of Wichmann, &c., or the *acute asthma of infants* of Millar; thinking that this affection is identical with that noticed by Clarke, Cheyne, Ley, Marsh, and others. These distinct disorders have been confounded together by other writers also, and more recently by Dr. Joy.—I proceed to consider *stridulous inspiration*, or *stridulous laryngic suffocation, of children*. The affection most nearly resembling it, in this class of patients, is that to which I have now referred, and which I have described as a species of *croup with predominance of spasmodic or nervous symptoms* (*see art.* Croup, § 14. *et seq.*); both these distinct affections having come frequently under my care, especially during the fifteen years that I was physician to the Infirmary for Children, both in that institution and in private practice.

i. Stridulous Laryngic Suffocation in Children. — Synon. — *Spasm of the Larynx; Spasm of the Glottis*, Marsh. *Laryngismus stridulus*, Good. *Crowing Disease of Infants; Cerebral Croup; Spasme de la Glotte et du Thorax*, Gardien. *Pseudo-Croup nerveux*, Guersent. *Asthma thymicum*, Kopp and Frank.

Classif. — II. Class; III. Order (*Author in Preface*).

3. Defin. — *Crowing inspiration, with a sense of suffocation in the larynx, and a tumid and purple countenance, commencing suddenly and after irregular intervals; the attacks being of very short duration, ceasing also suddenly, and not attended by cough, or other sign of irritation seated in the larynx itself.*

4. *A. Symptoms.*—The earliest accounts of this disease, distinct from the affections with which it was and still is confounded, have been furnished by Drs. John Clarke, Monro, Gölis, and Cheyne, who have described it nearly in the following terms: — The child is suddenly seized with a spasmodic inspiration, consisting of distinct attempts to fill the lungs, attended by a shrill noise: the eyes are staring, and the child is evidently in great distress, and seems threatened with suffocation. The face and extremities, if the paroxysm continues many seconds, become purple; the head is thrown back, and the spine bent: at length a strong inspiration takes place, a fit of crying generally succeeds, and the patient falls asleep. The paroxysm may occur often in the course of the day; but it is most apt to take place on first awaking, or on exposure to causes of irritation, or when vexed, about to cry, or startled by any cause.

5. This affection may continue to recur for some months, if neglected, until, at last, the extremities are also affected by spasm, or convulsions become general. When it appears upon waking from or during sleep, or upon rudely waking the child, there are a state of alarm and agitation, a struggle for breath, with crowing or shrill inspiration, which cease after the lapse of a few seconds. The attack may return after various intervals: at the commencement the child often continues many days, or even some weeks, exempt from them; but, if the morbid state on which they depend be not removed, they generally return more frequently, and at any period in the day or night, and are brought on by the most trivial circumstances, especially by surprise, fright, or any mental irritation or excitement. At last the child may be carried off by an attack, and with the usual signs of asphyxia.

6. In some cases, this affection of the glottis goes on, unassociated with spasm of any other part, beyond the attempts to inspire, which are generally powerful and convulsive. But in severe or neglected cases, and, in some instances, from the very commencement, the muscles of the arms and legs are affected; the thumbs are drawn firmly in upon the palms of the hands; the toes are bent downwards, and the wrists and ankle-joints are inclined inwards, forming what has been named "*carpo-pedal contractions.*" The progress of the disease is not uniform: occasionally the attacks become less severe, less frequent, and less complicated, and again resume their former frequency and severity. They may be fatal in the simple laryngeal forms: or they may not prove so until they are attended by the carpo-pedal contractions, or pass into more general convulsions. I may, however, mention, that not only is the laryngeal affection sometimes simple, and unattended by

+ All the other circumstances named are remote predisposing causes but this is a mere coincidence.

the carpo-pedal contractions, but that these contractions may be the only form of spasm, and may entirely disappear with the morbid condition of which they are sympathetic, without the larynx being affected; in rare instances even, they may precede the affection of the glottis, and be associated with it. When convulsions or general spasms supervene, they are often very severe and tetanic.

7. This affection of the larynx, either in its simple state, or when associated with the carpo-pedal contractions, or with more general spasm or convulsion, rarely presents itself without more or less evidence of disorder of the general health, in connection with more especial derangement of either the digestive organs or of the cerebral circulation or functions, or with dentition. In some cases, however, where the affection is connected with irritation near the base of the brain, the constitutional disorder may not be very manifest at first, the sleep being sound, the appetite good, and the countenance lively. But, if the state of the patient, while sleeping and waking, be very closely observed; if the evacuations, the state of the abdomen, and of the gums, the position in bed, the temper, the expression of the countenance, and the state of the brows upon exposure to light, &c. be attentively examined, evidence of disorder will be found in either the brain, or in the digestive organs, or in the gums, or even in all of them in many cases, but most generally in the brain and digestive organs, sometimes in both; and very rarely, and then merely accidentally, will there be found any affection of the respiratory passages, such as catarrhal, or bronchial, or tracheal irritation. Although the early state of the affection may be connected with, or sympathetic of, the irritation of teething merely, or of disorder of the alimentary canal, still it may become, after its continuance, or in its more advanced states, very manifestly associated with disease within the cranium, such disease being more evident as this affection proceeds.

8. *B. The diagnosis* of this affection has been well stated by **Wichmann** and **Schmalz**, and still better by Mr. **Ryland**. It can be confounded only with the spasmodic form of croup, with which, as I have stated, it has been, even recently, confounded by some writers of pretension. It differs from spasmodic forms of croup, in its being excited by the passions of the mind, and causes of momentary irritation, and by the irritation of distant but related parts; it occurs chiefly in those who are disposed to convulsive affections; its attacks are intermittent, distant, and irregular, and are relieved chiefly by means which impress the nervous system; it has no precursory signs, but attacks suddenly and unexpectedly; there is neither fever, cough, nor pain; catarrhal symptoms form no essential part of it, and it presents, after death, no traces of irritation in the respiratory passages: whilst *spasmodic croup* depends upon cold, damp air, and sudden atmospheric vicissitudes; and the fits of difficult breathing in it are attended by cough, the symptoms gradually subsiding, or being more quickly relieved by the accession of vomiting: it presents remission in the day, with exacerbations in the evening and night, and generally terminates with a glairy expectoration, &c. (See **Croup**, § 14.)

9. *C. Causes.* — The *more remote causes* are not very manifest. *Infants* and *young children* are most disposed to it. Dr. **Hamilton** considers it peculiar to the period of cutting the deciduous teeth. Dr. **Clarke** thinks that it seldom occurs after the third year. Mr. **North** says that the earlier symptoms generally appear between the third and seventh month, and that the disease seldom occurs after the appearance of the teeth. I have rarely met with it after the third or fourth year. The numerous instances I have seen, and I have had as many as three cases under treatment at the same time, have been generally between the third month and third year of age. It may doubtless occur at a more advanced age; but most of the cases which have been said to have occurred from four or five to ten or twelve years of age have been cases of the more spasmodic forms of croup.

10. Children who are hereditarily predisposed to cerebral affections; who are of a scrofulous diathesis; and who are insufficiently nourished, or live in a close or unwholesome air; those brought up by hand, or who are delicate during the early months of existence, or are reared with difficulty — whose sutures are long in closing, and whose digestion and assimilating processes are weak and readily disordered, are the most prone to this affection.

11. The pathological states of which it is most frequently sympathetic, or by which it is generally caused, are, functional disorders of the digestive organs, especially the alimentary canal and liver; difficult or delayed dentition, generally with signs of irritation, tumefaction or inflammation of the gums, or with the appearance of several teeth at the same time; inflammatory states of the membranes of the brain, changes in them or in the cerebral structure, or irritation about or near the base of the brain, or effusion into the ventricles; tubercular formations in the membranes, or within the cranium; enlargements of the glands, or of the thymic gland; and scrofulous enlargement or other disease of the cervical glands, or of the glands at the root of the lungs, whereby the recurrent or other laryngeal nerves are irritated or pressed upon.

12. *D. The nature of the disease* has lately been the subject of much discussion. It has not been very recently disputed that the larynx itself is entirely free from lesion: that is admitted. The questions are: is this an affection depending upon inflammatory irritation — or irritation of any kind — at the roots or origins of the laryngeal nerves, or communicated to, or existing in any portion of them, whereby the muscles which constrict or close the glottis are unduly contracted, — is it spasm of these muscles from direct or indirect irritation and sympathy; or is it owing to pressure upon the nerves which actuate the muscles which open the glottis, thereby paralysing them? The crowing or shrill inspiration, with the struggles to inspire, dread of suffocation, &c. are unquestionably owing to a more or less complete closure of the glottis; but that the closure results from *spasm* of the constrictors, or that it proceeds from *paralysis* of the dilators of the larynx, are the points requiring to be proved. The disease may be the result of either morbid condition — either may be considered as sufficient to cause it; and we may even admit that the one condition may produce it in some instances, and the other in different cases. The former of these views — or the opinion that

the affection proceeds from irritation at the origin of the nerves, or in the nerves themselves, which supply the muscles constricting the glottis, or from irritation in distant but related parts acting sympathetically upon these nerves, — was the one very generally entertained, until Dr. Ley proposed the opposite or latter view.

13. There can be no doubt of the digestive organs or of the gums sometimes evincing disorder in connection with the first appearance of the laryngeal affection, and without any sign of disorder within the cranium; and there can be no doubt of the chief and primary indications of disorder having manifested themselves occasionally in the head; and it is equally evident, that whatever lesion, either during life or after death, observed in the brain, has often been super-induced by, or has been the consequence of, previous disorder, or of the repeated attacks of laryngeal suffocation and the consequent congestion of the brain. I have even seen cases in which the brain appeared either primarily or very early affected in connection with the stridulous respiration, and yet, after every disorder referable to the brain had been quite removed, both the suffocating inspiration and the carpo-pedal contractions continued, although in milder grades, and recurred until the digestive functions and secretions were brought to a healthy state, and the child had had the advantage of change to a pure and healthy air. Views as to the nature of this affectioa should not be based upon the history of a few cases, but upon that of many, and upon *post mortem* examinations. Some cases have appeared to proceed from dentition only, others from disorders of the digestive organs merely, and others from disease of the brain; and yet, upon examination after death, those cases which have manifested even the least amount of cerebral disorder during life have presented great congestion and vascular injection of the brain and its membranes, particularly about its base and near the medulla oblongata, sometimes with effusion of serum, in rare instances even of blood between the membranes, and in the ventricles, especially the fourth ventricle. In many of such cases, there can be no doubt of the lesion within the brain being the consequence of attacks of this affection, and more particularly of the paroxysm which terminated the life of the patient. One argument in favour of the opinion that the lesions observed within the cranium are the consequences, rather than the causes, of this affection is, that the same state of parts in this situation is generally found unconnected with any obstruction to respiration. In such cases, however, it is difficult to determine whether or no lesions apparently the same are actually so; and it should be kept in mind that, owing to the physical conditions of the parts inclosed by the cranium and spine, congestion or effusion will produce not only pressure in its immediate vicinity, but also counter-pressure in the most remote parts of those inclosed in them.

14. Whilst Mr. Ryland and Mr. North believe that the dependence of this affection upon disease within the cranium is not proved, and whilst Dr. Marsh seems to think that it may proceed from inflammation of or at the origin of the pneumogastric nerve, Dr. Ley imputes it to paralysis of the muscles which open the glottis, in consequence of the pressure of enlarged glands upon the recurrent nerves in some part of their course. The glands, to the enlargement of which he ascribes the crowing inspiration, are those at the roots of the lungs, both before and behind the bifurcation of the trachea, with others which lie upon the arch of the aorta, and not unfrequently between the carotids and the deep-seated chain of cervical glands, or *glandulæ concatenatæ*. That these glands are often enlarged in infants and young children, particularly those of a scrofulous constitution, cannot be denied; and that, when thus enlarged, they may occasionally press injuriously upon the recurrent nerves and produce this affection, may be the case; but that it always proceeds from this cause is not in accordance with my experience; for I have seen cases in which no evidence of enlarged glands was furnished either during life or after death; and, besides, the affection will often altogether cease, after having been present for a day or two, upon having recourse to means which could either but little affect the state of these glands, or not affect them in so short a time. The recent experiments, however, of Dr. Reid (*Ed. Med. and Surg. Journ.*, vol. xlix.) have shown that the superior laryngeal nerve is almost entirely a sensory nerve, and that the recurrent is almost exclusively motor, supplying both constrictor and dilator muscles; and that severe dyspnœa, amounting to suffocation, may arise from *irritation* and *compression* of the inferior laryngeal nerves, or the trunks of the pneumogastrics. For when both or even one recurrent nerve was irritated, the arytenoid cartilages were approximated, so as in some cases to shut completely the superior aperture of the glottis. When the recurrents are cut and compressed, the arytenoid cartilages are no longer separated during inspiration, and their movements are so completely passive, that they are carried inwards by the current of entering air which they consequently impede, whilst they are separated again by the expiratory blast.

15. My own observations of this disease lead me to infer: — 1st, that it may proceed from direct or reflected irritation merely — the primary source and seat of such irritation being either in the gums or in the alimentary canal, or about the base of the brain or medulla oblongata; 2d, that the frequent result of attacks of this affection is to develope whatever disorder may primarily exist within the cranium, and to occasion inflammation, or congestion, or effusion in this situation; 3d, that irritation commencing in either of the three quarters just assigned may be sometimes propagated to the recurrent nerves, and expressed through them in the muscles of the larynx; 4th, that the carpo-pedal contractions or more general convulsions are frequent complications or associations of this affection, are often merely contingent, and, although they may proceed from the same source, may nevertheless arise from different sources, of irritation; 5th, that when the laryngeal affection is thus associated, there is greater reason to believe that the parts about the base or centre of the brain are more especially implicated; 6th, that, even in those cases where enlarged glands exist and press injuriously upon the recurrent or other nerves, it is quite as likely that they irritate as that they paralyse these nerves; 7th, that the effects observed to follow an enlarged thymus gland, about to be noticed, although illustrating

the influence of enlarged glands in producing this affection, do not prove that the influence is more that of pressure, than that of irritation, of the laryngeal nerves; 8th, that enlargement of either the thymus, or the bronchial glands, or the glandulæ concatenatæ, may act injuriously by pressing on the veins, and thereby preventing the return of blood from the head; congestion, effusion, and pressure of parts within the cranium resulting therefrom, and giving rise to the affection of the larynx, by either irritating or paralysing the laryngeal nerves.

16. *E. Closure of the Larynx by enlarged Thymus Gland.—Thymic Asthma*, of Kopp.—Mr. Hood of Kilmarnock first directed attention to enlargement of the thymus gland, and its influence in producing morbid closure of the glottis, with suffocation, and pressure of the veins returning the blood from the brain. This memoir, although little attended to at the time of its publication, is one of the most important that has appeared in recent times, and contains the particulars of nine cases, in which the appearances were observed after death, with several important pathological inferences. (See *Edinb. Journ. of Med. Science* for Jan. 1827, p. 39.) More recently (1830) the subject was treated of by Kopp, Hirsch, and Dr. Montgomery. Still Mr. Hood's memoir is the most full and circumstantial which has hitherto appeared on the subject. A few cases of the disease have been seen by me since my attention was directed to it by this writer; and three of them were examined after death, the appearances being altogether the same as those described in Mr. Hood's paper. The enlargement of this gland is apparently of a scrofulous nature, as it is sometimes connected with scrofulous enlargement of other glands. It may, however, be the result of simple hypertrophy and inordinate distension of its substance by vascular congestion, favoured by constitutional peculiarity and over-feeding. In some cases the gland is denser, redder, and more fleshy than natural. Occasionally it exudes a milky fluid when divided; and, according to Mr. Hood, a cream-coloured or puriform fluid. In two cases this writer found abscess and ulceration of this gland. In other instances it has contained tubercular matter, or a substance resembling cheese. When the enlargement has induced a congested state of the brain, probably with some degree of serous effusion within the cranium, owing to its pressure on the veins in the top of the chest, it may be expected that surprise, sudden excitement to cry, or bodily efforts will bring on attacks of this affection, by aggravating the morbid conditions upon which it depends.

17. *a.* Mr. Hood has noticed the following varieties of this affection. The *first* modification consists of an enlargement of the gland without any obvious cause, and when the child apparently continues to enjoy perfect health. Most frequently slight injury or sudden surprise is assigned as the cause of inducing an effort to cry, without the child being able to raise the voice, during which the face becomes livid, respiration is suspended, and strong convulsive struggles seem about to terminate its existence. If now the child be able to make an inspiration, the functions are soon restored, and in a short time it recovers its wonted health and spirits. An attack of this kind is attended by the utmost danger; yet, by adopting means for promoting health, the child may never have a return of the complaint. In the *second* form, the child still retains its usual plumpness, but the flesh is soft and flabby, and the countenance somewhat pale, and, on crying, quickly becomes pale and livid. On awakening out of sleep, or beginning to cry, the infant seems incapable of making an inspiration, the face becomes livid, and there is an appearance of alarming convulsions; but generally these symptoms suddenly cease on taking the child up. The same kind of fits may be brought on by feeding, dressing, crying, &c., or by whatever excites or irritates it. At first the attacks are seldom, but they become frequent as the disease makes progress. Yet it occasionally happens that the child improves in every respect for weeks or months, and yet it suddenly expires in an attack. In all such cases, the veins of the meninges are found after death loaded with blood, with more or less serous effusion between the membranes and in the ventricles. The veins of the neck and top of the chest are much distended by the pressure of the enlarged gland, and the heart is void of blood or coagulum. In a *third* class of cases which Mr. Hood has noticed, the voice is altered just before and after the fit, and has a croupy sound, which is not heard during the height of the attack, for then respiration is altogether suspended. He considers the complaint to be much modified by derangement of the stomach, or by intestinal irritation, or by difficult or painful dentition.

18. It is very difficult to *distinguish* these cases from those arising from other causes, as noticed above (§ 13—15.); and it is probable that many of those attacks which have been referred to disease within the cranium, or to dentition, disorder of the alimentary canal, and to scrofulous glands irritating the recurrent nerves, have been instances of the disease caused by enlargement of the thymus gland. The symptoms, particularly as respects the stridulous inspiration, the threatened suffocation, and the occasions and recurrence of the attacks, are very nearly the same; and I know, that most of the cases which I have seen since the publication of Mr. Hood's paper would have been considered cases of laryngeal affection from the more remote causes of irritation if that paper had not appeared; which paper I believe to have originated the views of Ley, Kopp, and others. Still all cases of laryngeal suffocation, appearing spontaneously in children, do not proceed from enlargement either of this gland or of any other, for undoubtedly some cases arise from the causes noticed above (§ 13. *et seq.*); and, in these, the glands of the neck and top of the chest are either unaffected or not materially affected. Indeed, it is not yet fully shown whether or not the symptoms are caused more by the pressure of the enlarged glands upon the veins, and the consequent congestion, pressure, or counter-pressure, of the parts at the origin of the laryngeal nerves, than by the direct effects of these glands upon the nerves in their course. If they proceed from the former condition, they are the consequences of the superinduced state of parts at the base of the brain, and they may appear whenever the same state of parts arise either primarily, or from other causes.

19. *b. The diagnosis* of enlarged thymus gland is a matter of importance, but of difficulty. It may, however, be inferred to exist when the infant

is gross, pale, flabby, and scrofulous; when the attacks are severe, suffocative, and unattended by any marked evidence of head-affection, or of disorder of the alimentary canal; when there is distension of the veins in the neck; when the lower part of the neck, between the inferior attachments of the sterno-mastoid muscles, appears full or tumid; when the top of the sternum seems elevated, or pushed out, and when there is dulness on *percussion* under the sternum, particularly its upper portion, and on each side of it. Fulness of the veins about the head and neck, without any obvious cause, or an unusual increase of that fulness when the head is somewhat low, should excite a suspicion of the existence of this lesion. This form of the disease is most common in children from a few weeks old to the age of two or three years; but it not infrequently appears in those of four or five years of age, and it may even occur in grown up or aged persons.

20. *F. The prognosis of stridulous affections of the larynx* should be stated with much reservation and caution. A child that has once had an attack should be considered in a precarious state, as long as it evinces any sign of disorder, or until the period of first dentition has passed. The risk increases with the severity and frequency of the fits, and when they are associated with the carpo-pedal contractions or general convulsions. If the affection proceed from enlargement of the thymus or other glands, the danger is also greater than when it seems to depend upon dentition or disorder of the digestive organs only. If it appear in the course of disease within the cranium, particularly of meningitis and hydrocephalus, it is generally fatal, although I recently attended a case of this kind which recovered. The most *favourable* circumstances are a sound constitution, the attacks being slight and rare; the absence of affection of the brain, and of scrofulous disease of the thymus or other glands; and the ability to have change of air, especially to the sea-side.

21. *G.* Treatment.—The *intentions* with which the treatment of stridulous laryngeal affections should be conducted, are — 1st, To avoid the occasions or exciting causes of the paroxysms, — 2d, To remove the morbid conditions on which they depend; — and 3d, To endeavour to prevent the paroxysm from being followed by dangerous or fatal results. — *a.* The propriety of *avoiding the occasions* and causes by which a return of the fit is produced is so obvious as to require only the most cursory notice. Every source of excitement and irritation, both moral and physical, should be guarded against; and efforts of all kinds, especially straining at stool, ought to be avoided. Sudden surprises, and disturbances from sleep, excitement of the temper and passions, as well as all muscular efforts, should be shunned; and all the secretions and excretions ought to be freely promoted, without exhausting the powers of life.

22. *b.* The *removal of the morbid conditions* on which the paroxysms depend is obviously the most important indication. This should be attempted only after a careful examination of symptoms, especially those connected with the head and scalp, with the gums, and with the stomach and bowels. Sources of irritation in the chest, particularly in the top of it, and in the neck, should be carefully inquired after.—*α.* The frequent connection of stridulous affections of the larynx with *dentition* ought always to suggest an instant examination of the state of the gums; and if fulness, redness, dryness, or heat of them be present, or any other indication of irritation, and especially if the salivary flux, which usually attends dentition, be suppressed or scanty, a free division of the gums in the situation of the advancing teeth, and a recourse to sialogogues of a mild kind, should not be delayed.

23. *β.* If signs of disease within the cranium either have preceded or accompany the laryngeal affection, the treatment must be directed with a strict regard to the nature and intensity of such disease. The accession of carpo-pedal contractions, of general convulsions, or of strabismus, does not prove the existence of inflammatory action of the brain, for the paroxysms of laryngeal suffocation, by interrupting the return of blood from the brain, may have occasioned congestion, irregular circulation, or even serous effusion within the cranium, so as to give rise to these symptoms. However, inflammation may exist, and be accompanied with those and with other phenomena, especially in its advanced stages. Of themselves, these symptoms, indicate the necessity of relieving the oppressed brain, and restoring the healthy balance of the circulation in this quarter; but these ends cannot be attained by trusting to bleeding only or even chiefly, whereby the powers of life are often too far reduced without removing the morbid state of circulation in the brain. Bleeding, however, is generally required, but it must be resorted to according to the state of vascular fulness and power, and be aided by purgatives, alteratives, diuretics, cold affusion on, or frequent cold sponging of, the head, and derivatives, according to the features of individual cases.

24. *γ.* If the *stomach and bowels* are disordered, stomachic purgatives conjoined with alteratives, and given so as to act regularly and moderately, are required. Flatulence and acidity, which commonly are present in these cases, should be removed by prescribing alkalies or absorbents in conjunction with aperients and tonics. Small doses of calomel, or the hydrargyrum cum cretâ, may be given with calcined magnesia, or with the dried sub-carbonate of soda and rhubarb or jalap; and a mild tonic infusion may be prescribed, with a little of the sesqui-carbonate of ammonia, and of some carminative spirit. But chief reliance should be placed on change of air, on exercise out of doors, on cold sponging the head and general surface, and on cold salt water bathing when the patient can bear the shock of the bath, which should be cautiously and gradually tried.

25. *δ.* The presence of *eruptions* on the scalp, or of *enlargements of the glands* of the neck, should lead to examination of the state of the lower part of the neck and of the top of the chest, particularly in scrofulous, cachectic, gross, and unhealthy-looking children; and although in these disease may also exist, either in the digestive organs, or within the cranium, or in both these quarters, still enlargement or scrofulous changes of the more deep-seated glands, interrupting the return of blood from the head, and irritating the recurrent nerves, may be a chief or a concurrent cause of the laryngeal affection. In such cases, as well as in those where the thymic gland is apparently enlarged, strict attention to the state of the secretions and excretions, the exhibition of mild and tonic aperients and alteratives,

small doses of the iodide of potassium, with liquor potassæ, and sarsaparilla, change of air, especially to the sea side, an appropriate diet, and warm clothing, are the means chiefly deserving notice. An ointment with iodide of potassium may be employed externally, but the judicious use and combination of this substance, as an internal medicine, render it the most deserving of confidence in these cases. The preparations of quinine and of iron, especially the iodide of iron, and the compound steel mixture with liquor potassæ, are also of service, especially in cachectic, flabby, and pallid children; but as respects patients affected with any form of laryngeal affection in large towns, no means are so effectual as change to a pure, temperate, and dry air, especially in scrofulous constitutions, and without such change all other remedies may fail.

26. *c.* The *removal of the attack* seldom becomes the office of the physician; for the fit is usually short, and if it were not so, death would generally very soon result. The child should be held up, and somewhat forwards; and if respiration does not instantly follow, cold water may be sprinkled over the face, or it may be affused over the head, whilst the lower part of the body is plunged in warm water. If these measures fail, the shoulders and back may be slapped with the open hand or with a wet napkin, and stimulating salts may be held near the nostrils; but these are then rarely of avail. In those cases of laryngeal affection where the inspiration is made partially, and with a crowing and stridulous noise, and is not altogether prevented, and consequently where there is time to exhibit an *emetic*, one should be given forthwith, conjoined with a little camphor; and a warm bath, or the semicupium may likewise be resorted to. I have seen, however, the emetic fail to act in these cases, although it was given in a sufficiently large dose, owing to the oppression of the brain by the interruption to the return of blood from it; but, upon resorting to the affusion of cold water upon the head, the emetic effect was produced.

27. If none of the measures just proposed is attended with success, recourse to the operation of *tracheotomy* has been suggested by Mr. PORTER and Mr. RYLAND. It certainly, however, is not justifiable, as the former of these writers has stated, as long as respiration is carried on even with the greatest difficulty; for in almost every case in which the rima glottidis remains so far open as to allow of a partial transmission of air, the affection is not very severe, and the child will struggle through it. "But if," he remarks, "the child is to all appearance dead, and if the practitioner is called to him within any reasonable time, he should then, with the least possible delay, endeavour to inflate the lungs and restore animation by whatever means appear to be the speediest, and of these perhaps the most preferable will be tracheotomy." Dr. MARSH states, that Dr. JOHNSON had seen a child, in a state of asphyxia caused by this disease, recovered from apparent death, by the instantaneous application of artificial respiration.

28. ii. SUFFOCATIVE LARYNGEAL AFFECTION IN ADULTS. — *Croup-like Respiration in Adults.* — *Spasm of the Glottis in Adults.* — This affection, as it occurs in grown-up persons, proceeds from *three* principal sources: — 1st, *Tumours* of any kind pressing upon or irritating the laryngeal nerves, or pressing upon the veins; 2d, *Inflammation* or irritation of adjoining parts, as of the pharynx, epiglottis, œsophagus, &c.; and, 3d, *Sympathy* with the state of more remote parts, as in cases of hysteria and of irritation of the sexual organs, or spinal nerves.

29. *A. Tumours* of various kinds, small abscesses, and scrofulous deposits in, or enlargement of glands, may form in the immediate vicinity of the larynx and trachea, or between them and the œsophagus, and occasion fits of suffocation or stridulous or croup-like respiration. MORGAGNI, RUSH, and others have recorded instances of this kind, and I have observed them. Bronchocele, aneurisms of the arch of the aorta, or of the arteria innominata, and enlarged or scrofulous glands at the top of the chest, sometimes produce a similar effect.

30. *a. Bronchocele*, particularly in nervous and hysterical females, is very frequently attended by attacks of stridulous or croupy respiration, or fits of suffocation, especially upon mental emotion or physical efforts; and this is the more especially the case about the periods of menstruation, or when any irregularity of this discharge exists, as often observed in bronchocele affecting persons of this sex. — *b. Scrofulous* and *suppurating glands*, particularly those which are much enlarged, or contain purulent or scrofulous matters, in the vicinity of the trachea or larynx, act in the adult in a similar manner to that mentioned in cases of children (§ 14. *et seq.*). In a case on which I was recently consulted, a cluster of glands at the root of the lungs were remarkably large and infiltrated with tubercular matter, so as to form a very consistent tumour, producing not only more or less dyspnœa, owing to its pressure on the trachea, but also fits of suffocation, in one of which the patient expired. This case closely simulated one of aneurism of the arch of the aorta, owing to the size of the tumour and to the pulsation of the aorta being communicated to it. I have likewise seen the laryngeal affection caused by a fungoid tumour — a true *fungus hæmatodes* — attached to the posterior aspect of the top of the sternum. — *c.* Of the influence of *aneurismal tumours* in producing attacks of this affection no proof need be offered, as such instances are of frequent occurrence, and instances of them have been published by LAWRENCE, FLETCHER, and others.

31. *B. Inflammation of adjoining parts*, as of the pharynx, or of the œsophagus at its upper part, sometimes is attended by spasm of the glottis, particularly in nervous persons and hysterical females. In these, even the irritation of the pharynx or of the epiglottis, caused by the ascent of acrid eructations in the course of indigestion, or of the globus hystericus, or of flatulence in connection with hysteria, sometimes produce similar attacks. The irritation occasioned by an elongated uvula, either upon the epiglottis or upon the rima glottidis, has had the same effect in some cases. (See THROAT, *Diseases of.*)

32. *C. The irritation* of the sexual organs, or of the spinal nerves, is occasionally connected with this affection, which then assumes the form of irregular *hysteria*, and in such circumstances an attack is often produced by cold, or slight inflammatory action in the respiratory passages, which, from its severity and recurrence, may be mistaken for acute or chronic laryngitis, if the

various nervous and hysterical symptoms attending it be overlooked. In cases of this kind, an attack may be brought on by violent mental emotions, especially if the digestive or respiratory organs be in an irritable state at the time; but it seldom occurs unless the uterine functions be also disturbed, as indicated by either a disordered state of the catamenia or by leucorrhœa (see art. HYSTERIA, § 31. 37.). It should, however, be always kept in recollection, that cases in which there is some degree of inflammatory action and much spasm are often met with in females, particularly those liable to hysteria. I have seen several cases of this description, which required a treatment appropriate to their mixed nature. Severe attacks of spasm of the glottis are very apt to occur in the course of hooping-cough or bronchitis, when either of these occurs in nervous or hysterical females; and will readily be aggravated by a too lowering treatment.

33. *D.* TREATMENT.—It is obvious that the treatment of these affections should depend entirely upon the pathological conditions producing them. — *a.* When proceeding from *tumours* of any kind, or from small abscesses, or scrofulous enlargements of glands, the iodide of potassium, and liquor potassæ, taken with sarsaparilla, are the most efficient means which can be resorted to; and are especially useful when the affection is caused by bronchocele. If hysterical symptoms be present, the iodide of iron may be employed, or the foregoing medicines may be given with any of the preparations of valerian or of camphor. It is obvious that the dependence of this affection on aneurism, or on malignant tumours, almost precludes any hope of cure, and admits only of temporary alleviation.

34. *b.* Where inflammatory irritation of the pharynx, or upper part of the œsophagus, is attended with spasm of the glottis, means must be employed to remove the inflammation, and these will generally also prevent the occurrence of the spasm. After such depletions as the nature of the case may require, much benefit will result from the use of a linctus containing, in a lubricating and an emollient vehicle, a small quantity of the nitrate of potash, or of the hydrochlorate of ammonia, with a little vinum ipecacuanhæ, and any narcotic or sedative tincture or extract; and, if the spasms continue, a rubefacient embrocation may be applied around the neck and throat. The following have been often prescribed by me with almost instant relief, the embrocation being applied around the throat on flannel, until much heat and redness of the skin are produced.

No. 284. ℞ Potassæ Nitratis ʒ jss. (vel Ammoniæ Hydro-chloratis ʒ ss.); — Mucilag. Acaciæ; Syrupi Tolutani, āā ℥ jss.; Vini Ipecacuanhæ ʒ jss.; Tinct. Hyoscyami ʒ ij; Cetacei, vel Pulv. Tragacanth. q. s. ut secundum artem fiat Linctus a quo pauxillum, urgente dyspnœa, lambat æger.

No. 285. ℞ Linimenti Camphoræ Comp.; Linimenti Terebinthinæ, āā ℥ jss.: Olei Olivæ, ʒ iij.; Olei Limonis, et Olei Cajuputi, āā ʒ j. M. Fiat Embrocatio, more dicto utenda.

35. *c.* The *Hysterical* or nervous form of spasm of the glottis is almost instantly relieved by having recourse to the above *linctus* and *embrocation.* If these fail, which is rarely the case, camphor may be given with a narcotic, with the extract of belladonna, of opium, of henbane, &c., or with a full dose of Dover's powder. The preparations of valerian with ammonia are also of use. When the affection of the glottis is connected with inflammatory irritation, either in the bronchi, or about the pharynx, perseverance in the linctus and embrocation, varied according to circumstances, will generally remove both the one and the other. The disorder of the uterine functions, or the morbid conditions connected more immediately with the hysterical affection, will next require attention, particularly with a view of preventing a return of it. (*See* HYSTERIA —*Treatment of.*)

iii. ATONIC AND PARALYTIC STATES OF THE LARYNX. — SYNON. *Αφωνια, Aphonia* (from the privative *α*, and *φωνή*, voice, sound). — *Loquela abolita, Defectus loquelæ, Dysphonia,* Auct. var. — *Raucedo paralytica,* Darwin. — *Sprachlosigkeit, Stummheit,* Germ. — *Aphonie,* Fr. — *Afonia,* Ital.

CLASSIF.—IV. CLASS; III. ORDER (*Author*).

36. DEFIN. — *A partial or complete loss of voice and speech, owing to an atonic or paralytic state of the nerves of the larynx.*

37. This affection is generally *symptomatic,* but it is occasionally primary or *idiopathic,* as when it is caused by an exertion of the voice much beyond the power or tone of the parts: it is, however, then rarely or never complete. The term *aphonia* has often been employed synonymously with *mutitas* or *dumbness,* with which *loss of voice,* or aphonia, has thus been confounded. But in dumbness, or mutitas, the voice exists; it only cannot, owing to the abolition of the sense of hearing, be modulated into articulate or certain sounds. In aphonia, the voice is either partially or totally lost, the power of articulating existing when the voice is partially retained. In rare instances, however, the partial loss of voice is attended by a loss of the power of articulation, and, in this case, the powers of deglutition are also more or less lost. Aphonia, in various grades, may arise from a great variety of circumstances, and of morbid conditions, which may be arranged under the three following heads — 1st, *Functional* or *nervous* loss of voice; — 2d, *Catarrhal* aphonia; — 3d, Loss of voice from *inflammations* of the larynx and their consequences; — 4th, Aphonia from *tumours* of various kinds in or near the larynx; — and 5th, Aphonia from *disease, or injuries,* at the origin, in the course of, and affecting, the laryngeal nerves, so as to paralyse them.

38. *A. Functional or nervous loss of voice* may be said to be a more or less complete abolition of nervous power in the muscles of the larynx, independent of inflammation, or of organic disease of adjoining or of related parts. The *primary state* of this form of aphonia is generally caused by debility, and excessive efforts of voice, or inordinate exertion of the vocal organs. It may likewise result from overwhelming emotions of the mind, from sudden moral or physical shocks, from chills caused by sudden exposure to cold, or by drinking cold water, and from masticating narcotic plants in mistake. More frequently, however, it is merely one of the very numerous modes, in which *hysteria* in its irregular form manifests itself, and is then generally connected with irregular, difficult, or suppressed menstruation, with uterine irritation, &c. (See HYSTERIA, § 37.) In these circumstances the paralysed state of the muscles of the larynx may be attributed to an irregular distribution of nervous energy, connected either with exhaustion or with derivation to distant parts. This form of aphonia may be of very short or very protracted duration. It may recur frequently, or only at distant periods. It may also be only par-

tial, or altogether complete, and amongst the most difficult affections to remove.

39. *B. Catarrhal Aphonia* is of frequent occurrence, particularly in females. It is probably connected with congestion of the mucous membrane of the larynx and epiglottis, and impaired action of the laryngeal muscles. In its more complete and prolonged states, it is also partly owing to nervous or hysterical disorder, catarrh exciting and aggravating the functional affection. Catarrhal aphonia is usually accompanied with relaxation of the uvula, and catarrhal congestion of the posterior nares and pharynx, with an atonic condition of the adjoining parts, which is extended to the larynx.

40. *C. Inflammation*, its *consequences*, and *other organic changes*, as tumours, &c. seated in or near the larynx, occasion, as shown in other places, more or less complete aphonia. In the purely inflammatory states, the injection, thickening, tumefaction from effusion of serum in the connecting cellular tissue; and the impaired as well as embarrassed action of the muscles, always attending inflammation of their surrounding and connecting tissues, sufficiently account for the hoarseness of voice, and aphonia which accompany them. When œdema of the larynx, or when ulceration, or any other of the consequences of common or of specific inflammations, exists so as to injure or to destroy, more or less, the mechanism by which voice is produced, then no further agency is requisite to account for the phenomenon. The same organic lesions, which I have shown above (§ 28. *et seq.*) to be occasionally causes of spasm of the larynx, may also, particularly when they mechanically impede the motions of this part, or when they paralyse its nerves, produce aphonia. Tumours of any kind, or abscesses, will have this effect, when situated so as to act in either way.

41. *D. Lesions within the Cranium*, when they disorganize, press upon, or otherwise implicate the origins of the laryngeal nerves, or similarly affect them in their course, will cause complete aphonia, generally also with loss of the power of articulating, and sometimes also of deglutition. In these cases, congestion, effusion, or other changes of an organic or of a scrofulous kind have taken place at the base of the brain, near or in the medulla oblongata; or counter-pressure caused by effusion of blood or of lymph, or by scrofulous or other tumours in the vicinity, or even lesions of the dura mater or bones of the base of the cranium may have produced this effect. Aphonia from these changes either attends, follows, or even precedes apoplectic, paralytic, or epileptic seizures; and may generally be considered a very unfavourable circumstance, as patients thus affected rarely continue long exempt from a fatal seizure.

42. In some cases of this kind, inarticulate sounds may be uttered, the power of modulating the voice, and of articulating being lost. I was called upon some years ago to visit in consultation a gentleman who several months previously had lost the power of articulating any sound, however simple. The movements of the tongue were nearly abolished, and the power of deglutition, unless substances were conveyed over the root of the tongue, was lost. These were the only paralytic symptoms; and he was, in every other respect, in good health, and without any sign of cerebral disease. Treatment having proved inefficacious, my attendance after a time altogether ceased; but I learnt that he died suddenly, some months afterwards. Somewhat similar cases of palsy, affecting only the muscles of the larynx, pharynx, and tongue, have been observed by me in children, but they have generally been preceded by some acute cerebral affection, or by convulsions. In every case death has taken place suddenly; and, in those cases where inspection afterwards was allowed, organic lesions were found about the medulla oblongata, or at the base of the brain, and consisted either of those alluded to above (§ 41.), or of softening of the cerebral structure.

43. *E.* Treatment.—The plan of cure should entirely depend upon the evidence furnished as to the existence of either of the morbid states to which aphonia has now been referred.—*a.* If the loss of voice result only from relaxation or atony of the vocal chords owing either to debility or to over-exertion, *gargles* containing capsicum, a warm *rubefacient embrocation* around the throat, and tonic decoctions or infusions, with mineral acids, or other *tonics*, will generally be of service. If it be connected with *hysteria*, the same means as now advised, and the preparations of valerian, camphor, ammonia, iron, &c., may severally be employed, according to the state of the uterine functions and constitution of the patient. In the more obstinate of the nervous and hysterical cases of aphonia, *electricity* has been advised; and in these, I have found the *pyrethrum*, or other stimulating substances, used perseveringly, as *sialogogues* of great benefit. Occasionally an active *emetic*, consisting of ipecacuanha, decoction of senega, and some preparations of squills, has proved of service, particularly when followed by a stomachic purgative, and the tonic and stimulant remedies just mentioned.

44. *b.* When aphonia is *catarrhal*, the emetic and subsequently a stomachic purgative, diaphoretics, stimulating gargles, and embrocations, applied to the throat or around the neck, are generally of service. If it proceed from inflammation, œdema or ulceration of the larynx, — from destruction of the cartilages, or from other consequences of inflammatory action or of syphilis, the means advised for these lesions when treating of the several forms of *laryngitis* are then required.

45. *c.* If aphonia arise from *scrofulous* glands, *tumours*, or *other lesions*, paralysing the laryngeal nerves or mechanically obstructing the motions of the larynx, the internal use of *iodine*, of the *iodide of potassium*, with liquor potassæ, or Brandish's alkaline solution and sarsaparilla, may be tried, and aided by such other means as the peculiarities of the case will suggest.

46. *d.* When aphonia proceeds from *disease within* or *near the base of the cranium* — when it appears to usher an attack of apoplexy or palsy, or attends upon, or follows an apoplectic or epileptic seizure — when it seems to depend upon vascular congestion, effusion, or some organic lesion, the treatment must be remarkably varied, according to the nature and state of the disease of which it is a symptom. If it precede and seem to threaten an acute attack, vascular depletions, purgatives, and derivatives are indicated. If it follows such an attack, the above alteratives,

permanent derivatives, and drains, &c., particularly setons, issues, or open blisters, are requisite.

II. Inflammation of the Larynx. — Syn. *Laryngitis*, Swediaur. — *Cynanche Laryngea*, Cullen, &c. *Angina interna, Angina Canina*, Zacutus Lusitanus. *Angina trachealis adultorum*, Pinel. *Cauma Laryngitis*, Young. *Laryngite, Angine laryngée*, Fr. *Entzündung des Luftröhrenkopfs*, Germ. *Laryngita, Infiamazion di laringe*, Ital.

Classif. — 1. *Class*, 2. *Order* (*Cullen*).
1. *Class*, 2. *Order* (*Good*). III. Class; I. Order (*Author in Preface*).

47. Defin. — *Pain, soreness, constriction, and tenderness in the region of the larynx; epiglottis swollen and erect; breathing shrill and suffocating; voice hoarse, sharp, and lastly suppressed; short painful and convulsive cough; great anxiety and restlessness, with fever and occasional spasms of the glottis.*

48. This disease was first noticed with precision by the second Monro, Home, and Cheyne, and subsequently by Farre, Bailley, Blane, and others. The varieties which it presents in practice have been particularized by Cheyne, Cruveilhier, Bretonneau, Bayle, Trousseau, Belloc, Ryland, and others: but we are still without a correct arrangement of these varieties, in relation either to each other or to the complications in which they are very often presented to our observation. Before I describe the varieties of laryngitis, I shall state the *arrangement* of them which I shall adopt.

49. 1st, Catarrhal or slight Laryngitis, which often attends common colds and sore throats, and is characterised chiefly by cough and hoarseness of the voice. It generally subsides in the course of a few days, and often without the aid of medicine; but, in faulty or cachectic constitutions, or in the highly inflammatory diathesis, it may pass into some one or other of the following varieties.

50. 2d, Acute Laryngitis may appear, as other inflammations, either *primarily* or *consecutively*, and present certain forms depending upon diathesis, previous disorder, and epidemic influence. It may be *sthenic*, as when it occurs in a previously healthy constitution; — or *asthenic*, when it affects weak or cachectic habits, or appears in connection with some other malady. — *A. Sthenic Acute Laryngitis* may be — *a. Primary* and *simple;* commencing in, and limited chiefly to, the larynx and epiglottis, and attended by acute inflammatory fever. — *b*, It may be *consecutive*, and *complicated* with inflammation of the fauces, tonsils, and pharynx; or of the trachea and larger bronchi, &c., as in sporadic and epidemic croup (*Diphthérite*); albuminous exudations forming on the inflamed surface, and the attendant fever being of an inflammatory or sub-inflammatory character. — *B. Asthenic Acute Laryngitis* may be — *a. primary* and *simple*, with effusion of serum, or of a sero-puriform matter in the sub-mucous tissue of the larynx and epiglottis, the attendant fever being more or less adynamic or malignant, and the constitutional powers impaired. — *b. Secondary* and *complicated*, as when it occurs consecutively upon scarlatina, small-pox, erysipelas, or malignant sore throat, low fevers, &c.

51. 3d, Chronic Laryngitis, which may be either *primary* or *consecutive* of the acute, or of disease of related parts.— *a. Simple chronic laryngitis*, limited chiefly to the larynx and epiglottis.— *b. Complicated chronic laryngitis*, associated with disease of the lungs, generally of a tubercular or scrofulous nature, or with chronic bronchitis. — *c. Specific* or *syphilitic laryngitis*, attended by secondary syphilitic symptoms, or with the venereal cachexia. These are the several forms of simple and complicated laryngitis.*

52. i. Description. — *A*. Catarrhal Laryngitis is generally slight, and often attends catarrh, particularly when the catarrhal irritation extends from the fauces to the pharynx. It may be viewed merely as an extension of the affection of the mucous surface of the throat, thence to the larynx, and frequently also to the trachea and bronchi on the one hand, and along the œsophagus, on the other. It is characterised by the usual catarrhal symptoms, by hoarseness or partial loss of voice, and cough, which is at first dry, but is attended by slight or more copious expectoration as the complaint proceeds. There is either little or no attendant fever, or fever of a slight remittent form. This variety may pass into the acute, but it much more frequently is followed by the simple or complicated states of chronic laryngitis. It more commonly, however, disappears spontaneously or after treatment.

53. *B*. Acute Laryngitis is a most dangerous disease in all its forms; but more especially in the asthenic complicated form. The particular character or state which it may assume depends upon the habit of body, temperament, and previous health of the patient; upon the existing epidemic influence, and upon the nature of the disease on which it is consequent, or with which it is associated. It is a formidable malady, as respects the suddenness of the attack, the alarming and distressing nature of the symptoms, the rapidity of its progress, and the frequency of its fatal issue. Its occurrence in the course of other diseases, and the fact of its being the cause, in many instances, of the great danger and fatality of these, render it a subject of great interest. Viewing it in all its relations, it may be *divided*, as above (§ 50.), into the *sthenic* or truly inflammatory, or as it affects a person in previous health, and the *asthenic*, as when it appears in the cachectic or in the course of other maladies.

---

* These *forms* or *varieties* of Laryngitis may be arranged as follows: —

I. Catarrhal Laryngitis,	generally associated with catarrhal sore throat, catarrhal irritation of the respiratory passages, &c.		
II. Acute Laryngitis.	Sthenic.	*Primary and Simple.*	
		Complicated.	with tracheitis and bronchitis. with tonsillitis, pharyngitis, &c.
	Asthenic.	*Primary and Simple.*	
		Complicated.	with eruptive and continued fevers. with erysipelas, sore throat, &c.
III. Chronic Laryngitis.	*Simple* and *Primary.* *Complicated*, with disease of the lungs, &c. *Syphilitic.*		

54. *a. Sthenic Acute Laryngitis* may appear in various circumstances; it may be, — *α. primary* and *simple* throughout; or, *β. consecutive* and *complicated.* It is of importance that it should be considered in each of these forms, and with due relation to the other affections by which it may be preceded, associated, or followed; and this will become the more evident when the more complicated states of the disease come under consideration; for several maladies in which laryngitis often forms a most dangerous part have been frequently described without any reference to it, although the extension of disease to the larynx, in either a sthenic or an asthenic form, has constituted the chief interest and risk to the patient, attending them.

55. *α. Simple Acute Laryngitis* occurring *primarily*, or in a constitution capable of manifesting the *sthenic* or true inflammatory state of vascular action, frequently appears with some degree of sore throat, difficulty of swallowing, chills or slight rigors, followed by symptomatic inflammatory fever. Soon after *the commencement of the attack* a dull pain or soreness is felt in the upper and interior part of the throat, with a sense of constriction, and tenderness when the larynx is pressed. The voice is harsh, hoarse, or sharp, and there is a slight, frequent, short cough, without expectoration. The fauces are generally red or inflamed, and when the tongue is pressed downwards and forwards, the epiglottis may be seen erect, swollen, and red. At this stage of the disease the attendant fever is strictly inflammatory, the pulse being full, quick, and strong; the skin hot and dry, the face flushed, the tongue white and sometimes tumid, and thirst urgent.

56. At a more *advanced stage,* and as the tumefaction of the inflamed parts diminishes the aperture of the glottis, the voice becomes small, piping, whispering, and ultimately suppressed; the breathing difficult, inspiration being sibilous, shrill, prolonged, and laborious; the larynx is drawn downwards with great force on each attempt to inflate the lungs. The cough is stridulous, convulsive or strangulating, and attended by scanty, viscid, and transparent expectoration, and by attacks of spasm of the glottis threatening suffocation, which are occasionally induced by difficulty of swallowing, owing to the imperfect closure of the glottis by the swollen and inefficient state of the epiglottis. The eyes almost start from their sockets. The countenance becomes pallid and anxious; the pulse feebler, quicker, and less uniform; and the surface of the body cooler. The constitutional phenomena now indicate imperfect aërification of the blood in the lungs, the lips assuming a more leaden or livid hue, and the tongue a darker colour. More or less fulness or swelling may be observed in some cases around the larynx and in the course of the trachea. The patient is now apprehensive, restless, sleepless, and desirous of embracing any means of relief, feeling that he is on the point of suffocation.

57. In the *last stage,* respiration can hardly be performed; the voice is gone; the pulse is weak, small, and intermitting; the lips are livid, the face pale and leaden; and the surface cold or clammy. The patient sits upright with open mouth and out-stretched neck, grasping objects around him to assist the laboured inspirations. In this stage, he sometimes dozes; but soon starts up in the utmost agitation, gasping for breath, with convulsive struggles. Low delirium, drowsiness, sopor, or coma now sometimes appear; the pulse becomes more and more feeble, and the patient sinks in a state of gradual asphyxia, if he be not carried off in one of the spasmodic attacks of suffocation attending the cough, or following attempts at swallowing in the advanced stage of the malady.

58. The *course* of the disease generally presents the *three stages* indicated above, when it is not interrupted by treatment. These stages may be viewed as the *first, early* or *inflammatory* stage; the *second,* or *developed* stage; and the *third* stage, or period *of exhaustion and asphyxia.* The *duration* of this form of laryngitis varies from eight or twelve hours (ARMSTRONG and CHEYNE) to several days. The more usual duration, however, is from two to five days. It very rarely is longer than a few days, unless the disease pass into the chronic form. The more completely acute laryngitis is limited to the larynx, the shorter, in general, is its duration. Cases are recorded by RUSH, TACHERON, PORTER, and others, in which the inflammatory appearances were found limited to the larynx, and a fatal issue ensued within twenty-four hours from the commencement of the attack.

59. *β. Consecutive or Complicated Sthenic Laryngitis* is characterised chiefly by the extension of the inflammation from the fauces, tonsils, and pharynx on the one hand, to the larynx; and more rarely from the trachea upwards to the larynx on the other, as in sporadic cases of croup. In all such cases, the inflammatory action is chiefly superficial and is attended by an exudation of albuminous lymph on the inflamed surface. When the disease commences in the tonsils and fauces, and extends to the respiratory passages, it has been termed "*Diphthérite,*" from διφθερα, pellis, exuvium, or "*Angine Couenneuse,*" by M. BRETONNEAU, who wrote on this subject, and confounded this form of angina, — the "*Angina Membranacea*" of the older writers — both with *Cynanche Maligna,* and with *Sporadic Croup*; and in this he has been followed by several of his contemporaries. One part of this mistake has arisen from inattention to the characters of the attendant fever, and to the superficial manner in which the local affection has been viewed. Attention to the following facts will more fully explain the source of this very egregious mistake, — a mistake fraught with danger as regards the appropriation of the means of cure.

60. Inflammations of the throat frequently occur, both as *sporadic* and as *epidemic* diseases; they may be *simple,* or they may be the chief *complication,* and source of danger, in eruptive fevers. In many instances, and particularly when they are epidemic, they are accompanied with an exudation of lymph on the inflamed surface; and whether the inflammation commences in the tonsils and soft palate, or in the pharynx, or whether it assumes a *sthenic* or an *asthenic* character, owing to the nature of the constitutional disease of which it is a part, and the circumstances connected with the patient, it is more or less prone to extend itself through the various passages leading from the pharynx; and when the larynx and epiglottis thus become affected, the disease then assumes a different and a much more dangerous character, death sometimes taking place in a few hours. In all cases, when the inflammation extends from the

fauces, tonsils, and pharynx to the respiratory passages, the local appearances and the character of the attendant fever indicate the nature and tendency of the malady. In some epidemics, and in a few sporadic cases, both the local appearances and the constitutional affection indicate an acute and *sthenic* disease, — an albuminous exudation, or a firm and continuous coating of albuminous lymph, forming on the inflamed surface, and the attendant fever being inflammatory or sub-inflammatory.

61. In other epidemics, and even in a few sporadic cases, but more commonly when the affection of the throat accompanies the adynamic or putro-adynamic or malignant forms of eruptive fever, the inflamed parts present a dark red, approaching to a brown or livid hue, and the exudations, instead of being pellicular, firm, tenacious, and whitish or yellowish white, as in the sthenic form, and adhering firmly to the surface, are soft, broken into crusts of an ash colour, become darker after their formation, and are much more easily detached. In these latter cases, the vital powers are depressed, and the circulating fluids deteriorated; hence their *asthenic* form and rapidly fatal tendency, as observed in the more adynamic and malignant states of scarlatina, small-pox, measles, or in certain epidemics, and in rare sporadic cases. (*See* § 68.)

62. These forms of angina, which are thus distinct from each other, whether appearing *primarily* or as a *complication* of exanthematous or of other diseases — whether *limited* to the throat only or *extending* to the respiratory passages — have been confounded together by several pathologists. All of them may occur in adults as well as in children, although the latter are most predisposed to them, and especially those of a delicate, scrofulous, and inflammatory constitution. When the inflammation extends to the larynx, many of the symptoms of croup are present; and hence M. Louis described *consecutive or complicated laryngitis* as croup occurring in adults; and M. Bretonneau gave it the name of "*Diphthérite*," because of the albuminous exudation attending it, and without reference to the other local characters, and the form or state of the attending fever — matters of the utmost importance in describing the nature and treatment of anginous affections, particularly when complicating the eruptive fevers.

63. *Consecutive* or *complicated sthenic laryngitis* generally commences as above indicated; but the inflammation, instead of advancing from the pharynx to the larynx, may commence in the trachea and extend upwards to the larynx, as in some cases of croup; although this course is much more rare than the other. This form of laryngitis, as it appears either sporadically or epidemically, or as a complication of the more sthenic eruptive fevers, commonly commences with pain in the throat, difficulty of swallowing, and fever. The tonsils are swollen and red, and present on their surfaces patches of an opaque whitish concretion. If allowed to proceed, the inflammation and the membranous exudation spread continuously to the soft palate and pharynx; the glands at the angles of the jaws begin to swell, and deglutition becomes more difficult. Upon detaching the membranous concretion from the inflamed surface, the redness is increased in it, and a thicker concretion is produced on it, that adheres to it more tenaciously than the former one. Frequently some days after the commencement of the attack, the disease becomes milder, less disposed to spread, and sometimes ceases altogether without reaching the larynx; but, in most cases, laryngeal symptoms appear at the end of four or five days. A hoarse cough, altered sound of the voice, difficult deglutition, and dyspnœa, supervene. The breathing soon afterwards becomes laborious, sonorous, and quick, inspiration being prolonged, and expiration short and hissing, and the voice extinct. The countenance is now pale, leaden, and often livid, particularly during the fits of suffocation which occur, and the pulse small and intermitting.

64. The *duration* of the disease is various. The morbid action may continue in the tonsils, palate, and posterior part of the pharynx, for six or seven days before it extend to the larynx; but, after it has reached this part, death may take place in twenty-four or forty-eight hours, either from a paroxysm of suffocation, or in the slower mode of asphyxia noticed above (§ 57.) as often terminating the more simple form of the disease. In some cases, the laryngeal disease follows more rapidly upon the affection of the throat, and, in a few, it seems almost cöetaneous with this affection. In these cases, especially, the inflammatory action extends not only to the trachea, but frequently also to the larger bronchi, as demonstrated by *post mortem* examinations, and as more fully shown in the article Croup (§ 13. 35.).

65. *Consecutive sthenic laryngitis* is sometimes a complication of the more sthenic forms of scarlatina, measles, and small-pox, particularly in certain epidemics. But when it is thus complicated or associated, it generally assumes a less sthenic character, and approaches, in some cases at least, and especially in the constitutional affection, the *asthenic* or the next form to be noticed. In these associations the local affection varies considerably, particularly as respects the appearances of the albuminous exudation, which may be scanty, partial, or almost wanting. (See art. Throat, *Diseases of.*)

66. *b. Asthenic Acute Laryngitis*. This may occur either as a *primary* and *simple* disease, or *consecutively* upon, or as a *complication* of, another malady. It is comparatively rare in its simple form; but it is one of the most frequent and fatal complications of eruptive fever. It sometimes also occurs in the course of other maladies, as will be shown hereafter.

67. *a. Simple Asthenic Laryngitis.* — *Œdema of the Glottis.* — *Œdème de la Glotte,* Bayle. — In simple sthenic laryngitis there is generally more or less swelling of the margins of the larynx and epiglottis, owing to submucous infiltration of serum and lymph; but in the consecutive form, or that attended by albuminous exudation, such infiltration takes place to a much less extent, this exudation not merely mechanically obstructing the passage, but also irritating and producing spasm of the glottis. In the form of laryngitis now to be considered, the chief alteration which takes place is an infiltration of serum, and, in some instances, of a sero-puriform fluid, not only in the submucous cellular tissue, but also in the adjoining cellular tissue, or in that at the base of the epiglottis and surrounding parts. The disease commences with a continued and an increasing impediment to respiration, and with a feeling of

fulness and constriction in the larynx, and as if the passage was closed by some foreign body. The voice is at first hoarse, then sharp, stridulous, and hissing, and afterwards croupal or extinguished. There is a dry, hoarse, and convulsive cough, with fits of suffocation, causing the utmost agitation and distress. Whilst inspiration is prolonged and difficult, expiration is comparatively easy. Deglutition is not materially impeded, and pain, soreness, or tenderness in the laryngeal region, are not much complained of. In some instances, however, these are all more manifest, and considerable fulness or swelling is observed in the region and vicinity of the larynx. The constitutional symptoms are not acute or inflammatory, and fever may be slight or almost absent; but, as the disease advances, the pulse becomes weak, soft, small, quick, and irregular, and the system betrays imperfect aërification of the blood. In some cases, the attendant disorder is still more decidedly adynamic. The patient makes numerous efforts to expel from the larynx by forcible expirations matters which he feels to be a source of uneasiness and of obstruction, and to remove them by frequent attempts at deglutition. The fits of cough and suffocation generally terminate by expelling a little glairy mucus, which affords only slight relief. As the disease proceeds, the dyspnœa becomes more permanent, the fits of suffocation more frequent, and the cerebral functions disturbed. At last death takes place in the manner already described (§ 57.).

68. *β. Consecutive or Complicated Asthenic Laryngitis* occurs during the course of scarlatina, measles, small-pox, erysipelas, low or adynamic fevers, and of diffusive inflammation of the cellular substance of the throat. Most commonly the laryngeal affection is merely an extension of that of the throat, which commences in the tonsils and fauces, extending to the pharynx and larynx, and often also to the other passages connected with the pharynx. The local changes vary much with the nature of the primary malady, and state of the patient. In some cases, especially in those consequent on angina maligna, there is not only much diffused swelling of the parts, but also an exudation of soft dark lymph, which concretes imperfectly into crusts, or patches, and these irritate the larynx and epiglottis, especially when they become partially detached. Infiltration of the submucous cellular tissue, with swelling and softening, also takes place, the infiltrated fluid being either serous, sero-puriform, or sero-sanguinolent, or of a dark colour from the presence of blood-globules in it. The colour of the inflamed parts depends partly upon the character of the infiltrated fluid, upon the state of the lympth thrown out upon the diseased surface, and upon the grade of intensity or malignity marking the constitutional as well as the local malady. The affection of the throat, in these cases, particularly when it extends to the larynx, is attended by impaired vital cohesion of the mucous and submucous tissues, and by a soft or less tenacious state of the lymph, affused on the affected surface, which is, in some cases, membranous, but in others pultaceous, assuming a gangrenous-like appearance, from its colour and softness, and from the odour exhaled. In the more malignant cases, the crusts or patches of lymph become darker and more foul, owing to the exudation of dark blood, or of a bloody ichor from the inflamed surface, when they are being detached from it. In this form of the disease, the states of vascular action and tone, and the condition of the blood, which is always more or less altered, prevent the formation of a firm concretion on the inflamed surface, and give rise to the morbid and gangrenous-like exudations characterising it, as more fully shown in the articles SCARLET FEVER and THROAT.

69. When the larynx is consecutively affected in these asthenic or malignant cases, the progress of the disease generally is fatally accelerated. The breathing becomes laborious or convulsive; the inspiration difficult and prolonged; the voice croupal, whispering, or suppressed; cough frequent, suffocative, and harsh; the veins of the neck distended; the throat and laryngeal region tumid or swollen externally, and tender to the touch. In this state, sunken eyes, pallid countenance, dilatations of the nostrils, threatened suffocation, restlessness, anxiety, and distress, are rapidly followed by a leaden or livid countenance; by convulsions, especially in children, or by coma and death. In many of these cases, as well as in the more sthenic complications, the morbid action invades the trachea to a greater or less extent, but generally in a much slighter degree. (See art. CROUP, *Complications of*, § 18.)

70. *C.* CHRONIC LARYNGITIS.—*Phthisis Laryngea.*—Under this head have been comprised a number of chronic affections and alterations of the larynx, which are often associated with changes in either the epiglottis or the trachea, or even in both. These affections are frequently complicated still further with other maladies, especially with those of the lungs, and with chronic constitutional diseases. They may be — 1st, *primary, simple,* or the chief ailment; or 2d, *consecutive* and *symptomatic.* They are commonly inflammatory at their commencement; although the character of the inflammation may be either *catarrhal,* or *sthenic,* or *asthenic,* or *specific.*

71. *a. Primary and Simple Chronic Laryngitis.* — A comparatively *slight form of inflammation,* or rather a state of *catarrhal irritation,* may affect the mucous membrane of the larynx for several weeks, or even for many months, and produce merely hoarseness, a frequent husky cough, scanty mucous expectoration, and a sense of soreness at the top of the wind-pipe. This affection may be limited to the larynx, or be associated with relaxation of the uvula, or with indications of a similar irritation in the fauces, pharynx, and trachea. It is most common in persons exposed to cold and wet, and in the intemperate; and generally follows a neglected catarrh, or repeated catarrhal attacks. This form of chronic inflammatory action may exist for a considerable period without producing further change than thickening of the mucous membrane and submucous tissues; but it occasionally gives rise to further changes, especially to ulceration, to softening, to serous or sero-puriform infiltration, and several other lesions about to be noticed.

72. The more *severe states* of chronic laryngitis may commence in the above catarrhal form: they may even follow the acute attacks; but much more frequently they appear with hoarseness, and with a dry husky cough; and are considered as catarrhal only, until they are followed by disorganization and serious constitutional disturb-

ance. They are thus insidious, not only in their *primary* and *simple forms*, but also, as will be noticed hereafter, in their *consecutive* and *complicated states*. The *symptoms* which require the closest observations are those connected with the voice, the cough, the respiration, the sensibility of the part, the physical signs referable to the chest, and the expectoration. — The *voice* is variously altered. At first, the defect of the voice is apparent only when speaking loud, or when varying the tone; but it generally becomes more and more cracked, until its healthy tone is quite lost. Hoarseness is then always present, and is, in the more catarrhal and slight cases, loose, mucous, and deep; but, in the more severe and prolonged instances, it is commonly stridulous, dry, and squeaking, or whispering. In the worst attacks, it is more and more affected until it is altogether lost.—The *cough* is, in the early stages, short, dry, and hacking; but, in the latter stages, and when the glottis is incapable of being closed, it is loose, continuous, and hawking or peculiar, as noticed by MM. TROUSSEAU and BELLOC.—The *respiration* is usually affected sooner or later in the course of the malady. Difficulty of breathing frequently occurs in the night, and on any physical exertion, and is characterised by spasm of the glottis. In proportion to the mechanical impediment to the passage of air, and to the degree of œdema of the glottis attending the disease, are the dyspnœa and the hissing and stridulous noises on respiration increased. After the dyspnœa becomes permanent, or amounts to orthopnœa, death generally takes place in fifteen or twenty days. — The *sensibility* of the larynx is seldom very acutely affected, although it is always slightly increased. In one half the cases, pain is not much complained of: still it is felt, with a sense of soreness or tenderness, when the larynx is handled or pressed, or rubbed against the spine. The morbid sensibility of it is evinced chiefly by the effect of cold air upon it, and by the readiness with which cough is excited by this or by other causes.

73. The *expectoration* is at first scanty and mucous; but, as the disease advances to disorganization, or becomes more intense or acute, it is muco-puriform, sanious, or streaked with blood, or even fœtid; occasionally it is adhesive and ropy. Purulent expectoration sometimes relieves the difficulty of breathing; and when this is observed in connection with pain and soreness in coughing, and with hoarseness or loss of voice, *ulceration* may be inferred to have taken place. As the ulceration and disorganization proceed, dead or ossified portions of the arytenoid and cricoid cartilages, or calcareous substances formed in the larynx, are sometimes expectorated, and more rarely they fall into the trachea and pass into the bronchi, causing irritation, and consequent inflammation in the parts where they lodge.

74. *Difficulty of swallowing* is occasionally felt, particularly when the epiglottis is more or less implicated, or when irritation extends to the pharynx. In these, paroxysms of cough and suffocation are induced by the attempts at deglutition, and by portions of the substances taken passing into the glottis.—The *physical signs* indicating either the exemption of the bronchi and lungs from disease, or the existence of disease also in these parts, are much obscured by the impediment to the circulation of air through the larynx; and more dependence may generally be placed upon percussion than upon the respiratory murmurs in evincing this exemption. At almost any period of the progress of chronic laryngitis an *acute state* of inflammatory action may occur, generally with more or less œdema, or sero-mucous infiltration of the submucous tissues, and terminate the life of the patient in a very short period: and this may take place almost at any stage of the disease, either previously or subsequent to ulceration. In *simple* or *idiopathic chronic laryngitis*, death is occasioned either by this occurrence or by the paroxysms of orthopnœa, caused by spasm in addition to œdema, by disease of the cartilages and other lesions, or by the suffocative paroxysms induced by the passage of matters into the diseased larynx.

75. *b*. The *Complicated* and *Consecutive States of Chronic Laryngitis* are very much more common than the primary and simple. The most frequent of these complications is that with tubercular phthisis. M. LOUIS has remarked that upwards of one fourth of the cases of this malady were complicated with chronic laryngitis, this latter being the consecutive affection. It may also be associated with chronic tracheitis, with ulceration in the trachea and large bronchi, and with chronic inflammation of the pharynx; but the association is rarely thus limited, being generally extended also to the lungs. When chronic laryngitis extends to the trachea, or when chronic tracheitis extends to the larynx, and *Laryngo-tracheitis* is thus present in a chronic form, tenderness and soreness are often felt in the course of the trachea; and, in some instances, I have observed great swelling of the throat along the whole tube; but in all these the lungs were also diseased. This swelling in the course of the trachea arises from the existence of ulceration in the internal surface of the tube, and from the œdema or infiltration of the cellular tissue external to the cartilaginous rings.

76. The *epiglottis* may be inflamed and ulcerated without the larynx itself being materially affected, although the epiglottis is often implicated when the larynx is diseased. M. LOUIS states, that of eighteen cases of *inflammation* and *ulceration* of *the epiglottis*, the larynx and trachea were free from disease in six. Of these latter, pain, more or less severe, was felt by four in the superior part of the thyroid cartilage, or between this cartilage and the os hyoides. The pain was compared to that of a sore, to a pricking sensation, or to a heat of the part. In some cases it had lasted a month or two, but in others it had occurred but a few days before death. In these cases, although the pharynx was healthy, deglutition was difficult, fluids sometimes being thrown back through the nose. The twelve patients who had ulcerations at once in the epiglottis, larynx, and trachea, complained of dysphagia, pain, and occasionally regurgitation of fluids by the nose.

77. It has been shown that *simple chronic laryngitis* is generally attended by great mechanical obstruction and stridulous breathing; but when the laryngeal affection is consequent upon, or complicated with, *pulmonary disease*, the obstruction in the larynx is commonly much less, and stridulous breathing is hardly remarked. This is owing to the circumstance of primary chronic laryngitis giving

rise to more œdema, or infiltration of the submucous tissues, than laryngitis consecutive upon pulmonary tubercles. In this latter the inflammatory irritation and the consequent ulceration is more superficial and less obstructive to respiration than the former. In both acute and chronic laryngitis, the vesicular murmur becomes feeble in proportion to the obstruction, as shown first by Dr. Graves and Dr. Stokes; and, in severe cases, it can hardly be perceived, the feebleness or absence of this murmur being equal in all parts of the chest. In order to ascertain the presence of lesions of the lungs in cases of chronic laryngitis, more reliance may be placed on percussion than on the stethoscope. Where the mechanical obstruction is but slight, as Dr. Stokes remarks, this instrument may be used with exactness; but even in cases where the lung is fully and freely inflated, it will occasionally be next to impossible to determine whether the symptoms proceed from laryngeal disease alone, or from its complication with an affection of the lung.

78. The principal fact to be kept in recollection in cases of chronic laryngitis, is the very frequent association of pulmonary disease with it, even when the larynx has been the part seemingly first attacked. There is no doubt that chronic laryngitis is in some cases first developed, and that the lungs become secondarily affected, particularly where a predisposition to pulmonary disease exists; and in these especially the susceptibility of the larynx to causes of irritation is much increased; but both maladies may commence simultaneously, and even proceed *pari passu*, that of the larynx only being manifest, owing to the nature of its organization; and thus the pulmonary disease may seem to be consecutive, even whilst it is coëtaneous with the laryngeal, or even primary. The obscuration of the physical signs of pulmonary diseases by laryngeal affections is so great, that the former are generally masked by the latter from those who trust chiefly to these signs, to the neglect of those physiological and rational phenomena which generally accompany even the early stages of pulmonary consumption, and in which the closely observing physician confides more surely than in the proofs furnished by the stethoscope. It is only in the far advanced stages of pulmonary tubercles, that the physical signs are manifested, when they are complicated with chronic laryngitis, as shewn hereafter (§ 86). It may, however, be concluded, that where there are laryngeal cough, muco-purulent or purulent expectoration, hoarseness or aphonia, semi-stridulous respiration, emaciation, and hectic fever, pulmonary tubercles exist in advanced stages, whether they are indicated by the physical signs or not; and this inference is strengthened by the occurrence of night perspirations, irritability of the bowels, incurvation of the finger-nails, and various other symptoms.

79. *c. Syphilitic Chronic Laryngitis.*— Chronic laryngitis sometimes occurs in the course of *secondary syphilis*, and it then assumes a specific form, soon passes into ulceration, the ulceration apparently extending from the tonsils and pharynx by continuity of surface to the laryngeal mucous membrane. Hence syphilitic chronic laryngitis is almost always associated with syphilitic inflammation of the tonsils, fauces, and pharynx. Mr. Carmichael considers venereal ulceration of the larynx as the consequence of the *phagadenic* venereal disease; and he believes that the ulceration always propagates itself at its edges by continuity of surface from the fauces to the pharynx and thence to the larynx.

80. ii. Appearances after death.—*A. In the acute forms of laryngitis*, the lesions observed on dissection vary with the character and complications of the disease. — *a.* In the *sthenic* and *simple forms* the mucous and submucous tissues of the larynx are not only red and injected, but also swollen or thickened; and these appearances may be confined chiefly to the larynx, or extended to the upper part of the *trachea*. The *epiglottis* is very red, injected, thickened, or swollen and erect. The folds of the glottis, and the cellular tissue extending from the epiglottis to the glottis, are red and swollen from infiltration of serous lymph, or even of pure lymph, patches of which are sometimes found on the mucous surface of the larynx, and the inferior surface of the epiglottis. In cases which have not proved very rapidly fatal, a sero-puriform fluid, or even pus, escapes when these parts are divided. Ulceration is more rarely observed. — In the *complicated state* of sthenic laryngitis, or when the disease has been consequent upon inflammation of the throat, with albuminous exudations — or upon angina membranacea — a more or less complete and consistent coating of albuminous lymph is found in the pharynx, the larynx, and to a greater or less extent along the trachea; and often, in some degree, also in the large bronchi. The exudation, however, is either scantier, or consists of a tenacious or semi-consistent matter in the lower part of the trachea and in the bronchi. Occasionally the false membrane formed in the larynx seems to have been partially detached, and is loose and ragged, or is altogether removed. The mucous membrane and submucous tissues are red and injected, and frequently also more or less swollen.

81. *b.* The *asthenic form* of laryngitis is attended by a serous infiltration of the submucous cellular tissues, causing great œdema and swelling of the parts, the mucous membrane itself being but slightly injected. In some cases, the folds of the glottis are so infiltrated with serous or sero-puriform fluid as nearly to close its aperture. In many of these, the epiglottis is but slightly altered, but, in others, the part close below or at the root of the epiglottis and at the anterior and upper part of the larynx are most infiltrated, the former being in some instances separated from the latter by the effusion in this situation. — In the *complicated states* of asthenic laryngitis, particularly in the associations with scarlet fever, measles, small pox, erysipelas, or with diffusive inflammation of the cellular tissue in the vicinity, the submucous tissues of the larynx and epiglottis are often infiltrated with a dirty, sero-puriform matter, or with a foul serum and lymph, which fills the ventricles and surrounds the vocal ligaments, and sometimes extends to the cellular tissue at the root of the tongue and external to the larynx, and even to the adjoining parts. In these more malignant cases, all the tissues are more or less softened and discoloured; and the alterations frequently extend to the pharynx and fauces on the one hand, and to the trachea on the other.

82. *B.* In *chronic laryngitis* the structural lesions are numerous: — 1. The mucous mem-

brane is red in patches, and exhibits a granular appearance, even when it is not ulcerated, owing to enlargement of its follicles: it is also apparently thickened, but this change is seated chiefly in the submucous cellular tissue, and causes enlargement and imperfect mobility of the parts, with partial obliteration or linear contraction of the ventricles of the larynx. — 2. Serous, puriform, or tuberculous infiltrations of the cellular tissue, and of the internal laryngeal muscles, either with or without softening and atrophy of these muscles and of the ligaments, are often observed. — 3. Wasting and fibrous degeneration of the muscles which move the cartilages of the larynx, and contractions of the ligaments, are frequently met with. These lesions account for the loss of voice in this disease. — 4. Purulent collections, or small abscesses in the submucous cellular tissue, particularly in the ventricles and around the cricoid cartilage, are seen in a few cases. — 5. Ulcerations of the mucous and submucous cellular tissues occur in various forms and situations, and are amongst the most frequent lesions in chronic laryngitis. The ulcers sometimes are small and round, and penetrate only the mucous membrane; occasionally they are large, irregular, and superficial, with purulent secretion on their surfaces. In some instances they are still more extensive, and, in the syphilitic laryngitis, accompanied with warty excrescences. Ulcers are not infrequently found in the ventricles, particularly in cases of phthisis, and are either rounded and superficial, or deep and irregular. The arytenoid and even portions of the other cartilages are occasionally destroyed by ulceration, but chiefly in young subjects. In most instances, and in older persons, ossification takes place in the cartilages before the ulceration reaches them. Ulcers are most commonly seen between the vocal chords and the epiglottis, but they are often found in other parts of the larynx, and in the laryngeal surface and edges of the epiglottis, and more rarely at the lower part of the larynx and commencement of the trachea. — 6. In some cases, ulcerations varying in size, form, and depth, are found in the *trachea*, especially its upper part; and in one instance I found a fistulous opening into the œsophagus. The ulcers are chiefly in the musculo-membranous portion, especially when the affection of the larynx and trachea is consequent upon disease of the lungs. — 7. Ossification of the cartilages is generally observed in the more prolonged cases. The osseous matter is irregularly deposited, generally on the surface of the cartilages. The cricoid and thyroid cartilages become naturally ossified in advanced life; but MM. TROUSSEAU and BELLOC have shown that chronic laryngitis of two years' duration produces the same change in young persons, irritation accelerating those changes to which the tissues are naturally liable in the course of time. 8, Instances of *necrosis* of the arytenoid, cricoid, and even of the thyroid cartilages have been recorded by LAWRENCE, PORTER, CRUVEILHIER, OTTO, RYLAND, ANDRAL, and others. MM. TROUSSEAU and BELLOC found this lesion in more than one-half of the cases of laryngeal phthisis which they examined. They describe the cartilages to be denuded of their perichondrium, and of a dull dirty hue. The sequestrum of dead cartilage is not readily thrown off, and the cellular tissue adjoining it is generally infiltrated with a fetid pus. These purulent collections often open and discharge their contents, sometimes with dead portions of the cartilages, or with ossific deposits, or with carious portions of the ossified cartilages. The opening and discharge of these matters usually take place in the larynx, but in rare instances they have occurred into the œsophagus, or outwardly through the integuments of the neck in still rarer cases. These mortified portions of the cartilages, as well as carious portions of the ossified cartilages, and phosphatic concretions in the diseased larynx, are sometimes discharged without any preceding or attendant abscess, and merely as a consequence of ulceration. When their escape from the larynx is impeded or attended by much spasm, or when they cause much irritation on being detached, they act as foreign bodies, and occasionally produce suffocation. They may even fall into the trachea, and produce effects such as are mentioned when treating of *foreign bodies in the larynx and trachea.* — 9. The *epiglottis* is often enlarged, thickened, or swollen: frequently, also, it is ulcerated, chiefly however in the inferior surface, and at the edges, in connexion with ulceration of the larynx and disease of the lungs. In the syphilitic form of the disease, the ulceration extends from the lingual to the laryngeal surface, and sometimes destroys the whole of the epiglottis. In less common cases, it is contracted and shrivelled, and more rarely expanded and thinned.—10. Besides the above, cauliform vegetations, warty excrescences, tubercles, and more rarely cancer and hydatids of the larynx have been remarked, and some of these lesions have been seen extending to the epiglottis.—11. The *trachea* has been observed to contain morbid secretions proceeding from ulceration of its internal surface, or from disease of the bronchi or lungs. It is sometimes remarkably thickened from deposition of lymph in the submucous cellular tissue, and in a few instances a similar deposition is observed in the cellular tissue external to the cartilaginous rings. Redness and injection of the internal surface of the trachea, and ulceration as above mentioned, are commonly associated with tubercular excavations in the lungs, and are most frequently observed in its posterior or membranous part. In some cases, these changes, ulceration particularly, are confined to, or most remarkable on one side of the trachea, which invariably corresponds to the diseased lung; or, if both lungs be diseased, to that most affected.—12. In a remarkable instance which occurred to my friend Mr. WORTHINGTON, of Lowestoft, several of the rings of the trachea were absorbed, and in consequence of the fibrous structure being deprived of its antagonising power at that part, the canal was constricted so remarkably as hardly to admit a quill, and as to suffocate the patient.—13. *Tumours* of various kinds, *abscesses, aneurisms,* &c. have been found pressing upon the trachea, and even on the larynx, and causing not only permanent obstruction to respiration and spasm of the glottis, but also morbid secretions from the internal surface of these passages, and partial destruction or perforation of their parietes.

83. The lesions just described, will, in the various stages and grades of their developement, sufficiently explain the phenomena of acute and chronic laryngitis. When infiltration of the sub-mucous cellular tissue, obstructs the passage of air into the

lungs, or when the exudation of albuminous lymph upon the surface of the larynx, produces the same effect, respiration, voice, and speech, are more or less impeded, and the various morbid phenomena connected with these functions are developed. When a thickened granular, or superficially ulcerated state of the mucous membrane of the larynx is present, the muscles and ligaments being uninjured, and the mobility of the parts of the vocal apparatus is not materially affected, by infiltration of fluids or other lesions, respiration is not impeded, but hoarseness, and alteration of the tone of voice are present. When the muscles and ligaments are diseased, and when the subordinate parts of the apparatus are incapable of the requisite motions, aphonia is more or less complete.

84. iii. Diagnosis.—A. *Of the Acute.* The stridulous hissing and difficult breathing; the prolonged inspiration, the larynx being always drawn downwards most forcibly during the act, as first pointed out by me in the article Croup, and the reference made by the patient to the top of the wind-pipe as the source of his distress, are sufficiently distinctive of the nature of the disease.—*Abscesses* in the vicinity of the larynx may be mistaken for acute laryngitis; but examination of the upper part of the throat, and the partial or general swelling and tenderness observed externally, the confined motion of the larynx, particularly from side to side, and the difficulty of moving the jaw, will indicate the nature of the affection.—*Spasm of the glottis* may be mistaken for laryngitis; but it rarely affects adults, and only hysterical persons. In these, however, a slight form of laryngitis, as that sometimes consequent upon cold and common sore throat, is often attended by severe accessions of spasm, and may be erroneously viewed as hysterical spasm of the glottis merely. I have met with several instances of this *association of inflammatory and nervous affections of the larynx*, and the importance of recognising their exact nature has been made apparent in all of them. The previous catarrh, or sore throat, the existence of fever, the symptoms referrible to the larynx, especially the stridulous breathing, the hoarseness or aphonia, and the mere exasperation of the suffocative feelings by the nervous or hysterical state of the patient, will indicate the association here contended for; and which consists of a slight form of acute laryngitis presenting violent exacerbations owing to the nervous temperament of the patient.

85. It has been remarked above (§ 59.) that laryngitis is sometimes *complicated* with tracheitis, the complication taking place in *two* or perhaps *three* ways: — 1st. The inflammation may advance upwards from the trachea to the larynx. 2nd. It may extend from the pharynx to the larynx and trachea. 3rd. It may attack both the larynx and the trachea at nearly the same time. In cases of *primary* or *sporadic croup*, the inflammation appears in either the first or the third of these modes, and is generally at the commencement, or at an early period of its course, a *Laryngo-tracheitis* often extending, at an advanced stage, to the large bronchi, as shown in the article Croup. On the other hand, that complication of *laryngitis* which is *consecutive* of or *complicated* with *pharyngitis*, and which has been called "croup in the adult," "secondary croup," "epidemic croup," &c., commences and extends always in the second of these modes. Between these two kinds of *croup* as they have been denominated by several writers, or rather between these forms of *complicated acute laryngitis*, as I have termed them, the distinctions are of great practical importance. Yet they have not been made with sufficient precision. Dr. Stokes has pointed out many of the most important of them, but as some of them have not been considered by him with reference to the characters of certain epidemics, I shall modify a few of the distinctions he has adduced.

Distinctions between the chief Forms of complicated Laryngitis.

Tracheo-Laryngitis, *or* *Primary Croup.*	*Pharyngo-Laryngitis,* *or* *Secondary Croup.*
1. The wind-pipe first attacked.	1. The laryngeal affection consecutive of disease of the pharynx and fauces.
2. The local disease the chief cause of the attendant fever. The fever symptomatic.	2. The local disease occurring in the course generally of a constitutional, and most commonly of a febrile malady.
3. The fever inflammatory.	3. The fever sub-inflammatory, adynamic, or malignant.
4. Children principally attacked.	4. Both adults and children attacked.
5. The disease sporadic, and in certain situations endemic; but never infectious.	5. The malady frequently epidemic, and generally infectious.
6. The exudation of lymph spreading, from the trachea to the glottis, or from below upwards.	6. The inflammation, and the exudation attending it, spreading from the throat, or from above downwards.
7. The pharynx healthy.	7. The pharynx diseased.
8. Dysphagia either absent or very slight.	8. Dysphagia common and severe.
9. Catarrhal symptoms often precursory to the laryngeal.	9. Laryngeal symptoms occurring without the pre-existence of catarrh.
10. Complication, with bronchial or pulmonary inflammation, frequent.	10. Complications with these diseases rare.
11. Absence of any characteristic odour of the breath.	11. The breath often characteristically fœtid.
12. Necessity for antiphlogistic treatment, and the frequent success of it.	12. Antiphlogistic treatment very rarely requisite. Restorative, tonic, stimulating, and other remedies necessary.

86. *B. Diagnosis of Chronic Laryngitis.* — A peculiar laryngeal cough, a permanent change in the voice, difficult and sibillous breathing, and pain or tenderness in the larynx, generally characterise chronic laryngitis. But difficulty of breathing and pain may be wanting in the early stages of the disease, or may occur only occasionally in the advanced periods. When the laryngeal swelling or constriction is considerable, the difficulty of respiring, and the peculiar sound attending it, are sufficiently indicative of the disease; and, when these are wanting, the stethoscope will detect, as Dr. Stokes has shown, a harshness in the sound of the air passing through the larynx, suggesting the idea of a roughness of surface. When the laryngeal constriction and the laryngeal respiration are slight or altogether absent, disease of the larynx may yet be inferred as the cause of the cough and other symptoms by the negative indications of the thoracic organs, the sounds of percussion and of respiration being good throughout the chest. In abscess and mortification of the cartilages of the larynx there are laryngeal cough, fœtid purulent expectoration and

even hectic, and there may be no disease in the chest; but these cases differ from ordinary phthisis laryngea, particularly in the prominence and rapidity of the purely laryngeal symptoms. The difficulty of determining the complication of the disease with pulmonary tubercles in their earlier stages, or true phthisis laryngea, should lead to a careful investigation of the history of the case, with the view of ascertaining whether the laryngeal affection was primary or whether it supervened upon disease of the lungs. If it be found that the first symptoms were sore throat, relaxed uvula, difficulty of swallowing, and were followed by those of a laryngeal character, or that a syphylitic taint had existed, there is a great probability that the first morbid action was manifested in the larynx, and that the lungs were unaffected. But if, on the other hand, as Dr. STOKES observes, it is ascertained, that previously to any hoarseness, stridor, or dysphagia, there has been cough without the laryngeal character, particularly if it was at first dry; that the breath has been short, that there has been pain in the chest about the collar-bones or shoulders; that hœmoptysis has occurred; that hectic has been observed, although the expectoration continued mucous; and that the patient has emaciated, it is almost certain that the case is in reality one of pulmonary tubercles, in the course of which laryngeal disease has occurred. If, moreover, the patient is of a scrofulous diathesis, or has already lost brothers, sisters, or a parent, by tubercular disease, we may be certain that this is the nature of the case, although we can detect no physical sign of pulmonary tubercles. In examining such cases, a careful comparison of the sounds emitted on percussion by corresponding opposite portions of the chest; and an investigation by successive investigations or at different periods, will show the state of the disease. If, co-existent with laryngeal cough, muco-purulent expectoration, semi-stridulous breathing, and hectic, we find a notable difference between the sounds of opposite corresponding portions of the chest, there is almost sufficient evidence of tubercular disease of the lungs. When there is copious muco-purulent expectoration of considerable continuance, we may infer the existence of suppurating tuberculous cavities in the lungs. When there are dullness on percussion or cavernous rhonchus in some part of the chest, particularly under a clavicle or scapular ridge, with copious expectoration, night sweats, emaciation, &c., an advanced period of the tubercular disease is present.

87. iv. PROGNOSIS.—*A. In acute Laryngitis* the prognosis is considered more unfavourable than in any other inflammatory disease by Drs. CHEYNE, BAYLE, and others. Mr. BAYLE states that of seventeen cases observed by him during six years, only one recovered; but this is much below the average recoveries. Mr. RYLAND refers to twenty-eight cases treated by different practitioners, and of these ten recovered; but he believes that this proportion conveys too favourable a view of the usual termination of the disease, a greater number of successful than of fatal cases having been recorded. There can be no doubt of the correctness of the opinion given by Dr. WILLIAMS, that the prognosis should be very unfavourable, and the more so, the more progressive the difficulty of breathing. When the face becomes pallid and subsequently livid and the patient lethargic, the danger is extreme. The *complicated* and *asthenic forms* of acute laryngitis are especially fatal, particularly when they occur in an advanced stage of exanthematous, or epidemic, or malignant diseases. Hopes of recovery may be entertained in the milder forms or states of the malady, and when the breathing becomes less difficult, and is attended by a freer expectoration. The slight catarrhal form is merely a state of catarrhal irritation of the glottis, to which no risk is attached, unless it pass into the acute or chronic inflammatory states. Mr. RYLAND found that of the eighteen cases which terminated fatally, death occurred within the first twenty-four hours in four, on the second day in one, on the third day in four, on the fourth day in five, on the fifth day in one, on the sixth day in one, and on the eighth day in two instances.

88. *B. The prognosis of chronic laryngitis* entirely depends upon the states in which it is presented to our observation. In its *simple* and *mild forms*, a favourable yet cautious opinion may be given; for although they will generally yield to judicious treatment, exacerbations, œdema, or even ulceration, may take place. If, however, even these forms occur in a faulty or scrofulous constitution, a much more unfavourable opinion should be formed of the result. If, however, the disease has continued for any time; if it have not been amenable to treatment; if the expectoration has become abundant; and especially if the history and existing state of the case, and the presence of the symptoms noticed above (§ 86.), indicate its connection with pulmonary disease, a most unfavourable result may with certainty be anticipated. Fœtor of the breath and sputa indicate mortification of the cartilages, and is very unfavourable; but in simple laryngitis there is still a chance of the dead portions being thrown off, but there is no chance of laryngeal disease being cured when it is dependent upon tubercular excavations in the lungs. In the *syphilitic form* of chronic laryngitis, if the general health has not suffered much, and if the lungs be sound, the patient may recover; but the chances will depend entirely upon the degree of local lesion and the general state of the frame.

89. v. CAUSES. — *A. Acute Laryngitis* may directly follow exposure to cold, wet, and currents of air, continued or very great exertion of the voice, and accidental attempts to swallow acrid, corrosive, or scalding fluids. Mr. PORTER observes, that when a person attempts to drink any of these by mistake, a convulsive action of the pharynx and upper portion of the œsophagus takes place, and throws the offending fluid out through the mouth and nostrils, under the epiglottis, thus irritating and inflaming this part and the rima glottidis. Drinking boiling water in mistake by children who have been accustomed to drink from the mouth of a tea-pot, as in the cases recorded by Dr. M. HALL; the inhalation of very hot air, or of flame, as in some cases of burning as shown by Mr. RYLAND; and the inhalation of very acrid vapours, as the strong fumes of ammonia, or of iodine, or the chlorine gases, &c.; are also exciting causes of the disease. I attended a case many years ago with a practitioner, which was caused by swallowing a large quantity of mustard, in order to produce an emetic effect after poisoning from opium. The man recovered. In the *consecutive* or *secondary forms* above described

(§ 63.) the disease occurs in the course of *cynanche tonsillaris*, of *C. Pharyngea*, and of *C. Parotidæa*; and in a decidedly asthenic form, in the course of scarlet fever, measles, small-pox, erysipelas, and typhoid fevers. It may be consequent even upon glossitis, and diffusive inflammation of the cellular tissue of the neck or throat. Mr. LAWRENCE and Dr. WILLIAMS have met with it in the course of aneurism in the arch of the aorta. Acute laryngitis also may supervene at any stage of the chronic state of the disease.

90. The circumstances more especially *predisposing* to an attack, are frequent or habitual occurrences of sore throat; indigestion connected with biliary disorder, or with accumulations of bile in the biliary organs, and of morbid secretions in the alimentary canal; habitual intemperance, either in eating or drinking; particularly the latter; severe or prolonged courses of mercury, and unusual exertions of the voice. When inflammations of any kind attack the throat, or parts adjoining, their extension to the larynx is favoured by accumulations of morbid secretions and excretions in the abdominal viscera, and by depressed states of the powers of life, — a fact of great practical importance, and hitherto insufficiently attended to both in our pathological reasoning and in our therapeutical indications.

91. *B. Chronic laryngitis* may arise from the same *causes* as have been now enumerated; but it sometimes succeeds the acute disease, and much more commonly it follows the frequent recurrence, or neglect, of the slight or catarrhal state of irritation mentioned above (§ 52.). — Great or prolonged exertions of the voice, particularly by those addicted to the use of spirituous liquors, and the combination of neglected catarrh with intemperance, are the most common causes. Mercurial courses, the extension of syphilitic ulcers from the throat, dust or grosser foreign bodies inhaled or passing into the larynx, and injuries of the throat, also sometimes occasion chronic laryngitis. Persons of a scrofulous diathesis, — those liable to cutaneous eruptions, or who have been suffering for a long time the more severe forms of indigestion, particularly cardialgia with acrid eructations, and all disposed to, or already affected by, tubercular disease of the lungs, are especially *predisposed* to this affection. Its dependence upon pulmonary consumption is most frequent and intimate. It is most common at the middle period of life, or probably somewhat earlier, at least according to my experience; and is nearly equally frequent in both sexes. MM. TROUSSEAU and BELLOC think that it affects males oftener than females; Mr. RYLAND that it more frequently attacks the males.

92. vi. TREATMENT. — *A.* In the *acute sthenic laryngitis*, particularly in its *primary* and *uncomplicated* form, the treatment should be prompt, early, and decided, in order to arrest the disease before effusion, in any form, or in any situation, takes place. The necessity for having a very early recourse to treatment is shown by the rapid fatality of some cases (§ 58.). — The *intentions* with which remedial means should be prescribed are — 1st. To reduce inflammatory action, and thereby to prevent or arrest those consequences of it usually productive of a fatal issue; — 2nd. If effusion, or infiltration of the laryngeal tissues have taken place so as most dangerously to obstruct respiration, to obviate such obstruction and its consequences; — 3rd. To promote the removal of such lesions as have taken place.

93. *a.* The *first intention* involves a recourse to *bloodletting;* but a cure of the disease is not to be expected from this means alone, although it should be instantly and decidedly employed, and in the manner advised by me in the article BLOOD (§ 64.), so as to make a decided impression on the pulse without producing syncope, and within the first twelve or twenty-four hours from the accession of the disease. After effusion or infiltration has taken place, so as to interfere with the purposes of respiration, bloodletting will be then too late to be of any service. A repetition of the bloodletting, and the quantity of blood taken, must depend upon the severity of the disease, the habit and constitution of the patient, and the effect produced by it. *Cupping* on the nape of the neck, after the first or second venæsection, should not be neglected. By its means a very large or small, but always a definite quantity of blood may be taken, and with a derivative effect. A recourse to leeches is seldom so satisfactory as to cupping, in this disease. After the first blood-letting, a full dose of calomel — five or six grains, with three or four of JAMES's powder, and a third of a grain of opium, as advised by Dr. CHEYNE, should be given every third, fourth, or fifth hour, until the gums become affected. I have never seen any benefit derived from the application of blisters; and I am sure that I have seen them injurious. Dr. CHEYNE properly objects to them. A recourse to strong liquor ammoniæ, as suggested by Dr. J. JOHNSON, may be preferable; still it acts only as a vesicant; and, when applied over the throat, it is so near the seat of inflammatory action, as to excite its activity rather than to diminish it by derivation. ROMBERG, CAMPBELL, and others, advise the croton oil to be externally applied, but it is more appropriate in the chronic form of laryngitis.

94. For more than twenty years I have had recourse, immediately after blood-letting and the first dose of medicine, to the application of flannel, wrung out of hot water and freely sprinkled with spirits of turpentine, or with a combination of this substance with camphor, or with compound camphor liniment, around the whole neck and throat. This application, when duly managed and modified as respects its continuance and the combination of substances used, is the most efficient remedy in all the forms, simple and complicated, of acute laryngitis; and, as it does not vesicate, or at least very slightly, it is not in the way of the operation of tracheotomy, which will rarely be necessary when it has been early resorted to. It has a remarkable effect in restraining inflammatory action in parts near those to which it is applied, and in preventing and arresting the effusions and infiltrations consequent on inflammation. The success of this application will entirely depend upon the decision with which it is employed. Dr. CHEYNE objects to the use of tartar emetic in any way, lest it should excite vomiting, and by throwing matters against the erect and exposed epiglottis, and cause violent convulsive irritation; and Dr. WILLIAMS, for a similar reason, argues against the propriety of applying leeches on the tonsils, as proposed by Dr. CHEYNE and Mr. CRAMPTON. The irritation of

the bites, and of the blood proceeding from them, can hardly be supposed to be otherwise than injurious. The above measures may, although early resorted to, only delay the unfavourable progress of the disease — may fail in arresting the inflammation, and in preventing its consequences from dangerously or even fatally obstructing respiration. It is now that the *second* intention must be adopted; but the *third* should not be neglected from the commencement; for the removal of the lesions, or consequences of inflammation already produced, should be attempted forthwith; and the means best calculated to attain that end are also those best adapted to fulfil the first indication, more especially the free use of mercury, and the application of the embrocation, already mentioned around the neck.

95. *b.* The *second intention* must be resorted to as soon as the lesions consequent upon inflammation begin to obstruct respiration, so far as to prevent the necessary changes from taking place in the blood. If the strength fail, and pallor with lividity of the lips appear, blood-letting and the other means advised above will be of no avail, and *tracheotomy* is then indispensable. It may have been even too long delayed; for it should be performed before the blood is altered so far by the obstruction to respiration as to change its sensible qualities. Dr. CHEYNE justly remarks that if the symptoms be such as to contra-indicate blood-letting, and yet asphyxia is imminent, the operation should be instantly performed. As long as the complexion is good, and asphyxia not threatened, it may be delayed. Mr. LAWRENCE says that it should be resorted to as soon as the symptoms enable us to ascertain the nature of the disease; and, although this may be too precipitate a recourse to a surgical operation in itself and consequences not without some risk, it is preferable to delaying it too long. The effect of treatment, particularly of blood-letting and of the application around the throat, which I have advised, should be first observed; and if these do not give relief in a period varying from twelve to twenty-four hours, according to the urgency and peculiarities of the case, tracheotomy should be resorted to. But no precise time ought to be assigned before the operation is performed; for the local symptoms, and the states of the vital functions caused by the laryngeal obstructions, should alone guide both physician and surgeon in respect of it. There are pathological circumstances connected with too prolonged a delay of the operation which should not be overlooked, as they are the most powerful arguments against such delay. These are the increased disposition to bronchial and pulmonary congestion with obstruction to the respiratory function, and with interrupted change of the venous into arterial blood; and the fact that these changes, when they reach a certain pitch, often lead to fatal results, although the obstruction to respiration may have been removed previously to the occurrence of any immediate risk of asphyxia. Still the operation may be tried even when asphyxia approaches, as a few instances have occurred of its success at the last extremity; but the engorged state of the lungs and congestion of the bronchial surfaces, which increase with the progress of the local obstruction, generally pass into effusion or into an asthenic state of inflammatory action, when the respiratory actions are restored by the operation after having been too long delayed. An early recourse to the operation is particularly indicated when laryngitis has been caused by swallowing acrid or corrosive or boiling fluids, as the means of cure recommended do not act so rapidly in these cases as in many others, and an early opening into the trachea facilitates the treatment of the injured parts.

96. After the operation, care should be taken not to insert too long a tube into the windpipe, as such an one will excite serious irritation; and equal care should be observed that expectoration be not prevented by constantly expiring through this tube, otherwise the accumulation of mucous or muco-puriform matter in the trachea and bronchi will prevent all benefit from accruing from this measure. The tube, therefore, should frequently be closed after a full inspiration, and the patient be told to expire forcibly through the glottis, so as thereby forcibly to expel the accumulating matter. Until the obstruction in the glottis is removed by the mercurial treatment, which should be persisted in until its effects become manifest, active counter-irritants should be applied on the chest or between the shoulders, and the most efficient of these are terebinthinate embrocations and blisters. These, and a recourse to cupping, or to dry-cupping on the chest, according to circumstances, will diminish or remove the congestion of the bronchial surfaces and lungs, and the disposition to inflammatory action in these parts, which often destroy patients after tracheotomy had apparently for a time saved them, and which generally arise in the manner just stated, and less frequently are propagated along the respiratory passages as the disease proceeds and the powers of life are reduced.

97. *B. The complicated forms* of sthenic laryngitis require a different treatment from that advised in the simple sthenic form. In that *complication* which is consequent upon, or coëtaneous with, *tracheitis*, and which constitutes a very large proportion of the cases of CROUP, nothing can be added at this place to what has been fully adduced in that article, from a tolerably extensive experience. When laryngitis occurs from the extension of inflammation with albuminous exudation from the fauces and pharynx — is *consequent upon angina membranacea* — and when the local and constitutional symptoms indicate a more or less sthenic disease, the treatment should be such as may subdue increased vascular action, and be especially and early directed to the state of the fauces and pharynx, in order to prevent the extension of the morbid action from them to the larynx. The means most beneficial in this form of disease are fully described in the article THROAT — *diseases of*. When the larynx becomes implicated, a vigorous recourse to calomel, and the application of the terebinthinate embrocation around the neck and throat, sometimes preceded by cupping on the nape of the neck, are chiefly to be relied upon. Venesection is rarely indicated and as rarely beneficial in this disease, unless in its most sthenic states, and in plethoric and robust persons, where it should be employed with a careful observation of its effects; but the treatment will depend much upon the character of the epidemic. The topical applications of alum, in the form of a paste or otherwise, or of

+ He ought to be confined in a chamber, the heat of wh. is maintained at from 65 to 70° thro' wh. also an aqueous vapour is diffused;- this may be effected by having a large kettle kept constantly on the fire, with a long tube annexed to the spout to convey the vapour into the centre of the room.

nitrate of silver, or of muriatic acid, as advised for *angina membranacea* (*see* art. THROAT) are now generally of no avail; and if the former means are inefficacious, tracheotomy must be resorted to, and should not be too long delayed, although a successful result from it is even less to be expected in this malady, than where it is performed in simple laryngitis; for there is a much greater disposition of the morbid action to propagate itself from the larynx downwards, in the complicated, than in the simple disease, and patients are more likely to be carried off by the consecutive bronchitis.

98. C. *In the Treatment of Acute Asthenic Laryngitis*, blood-letting is inefficacious or injurious, whether the disease appear in its *simple form* (§ 67.) or in any of the *complicated states* (§ 68.) noticed above. The means which are most likely to be of any service in any of these forms of the malady are calomel conjoined with camphor and opium, in large and frequent doses, and the terebinthinate embrocation already prescribed, kept constantly applied around the neck, fauces, and throat. In the intervals between the doses of calomel, camphor and opium, stimulants, tonics, and antiseptics, are often required to support the powers of life, and prevent the progressive deterioration of the blood. In the complicated asthenic laryngitis attending *cynanche maligna*, or any of the more *malignant forms of eruptive fevers*, or *erysipelas*, calomel is not often of service, as the laryngeal affection generally terminates life before any constitutional effect can follow its exhibition. If, therefore, it be given at all, it should be prescribed with camphor, or with camphor and opium, either in the form of powder, or linctus, so that it may act upon the fauces and pharynx, and thence upon the larynx. In these complications, tracheotomy should be performed at an early period of the laryngeal disease, if performed at all; but at any period of these the chances of success from it are very few; for the constitutional disease, and the frequently attendant association of congestions, or asthenic inflammations of the bronchi or lungs, reduce these chances to almost the lowest calculation. In the *primary asthenic laryngitis* (§ 67.) tracheotomy is more likely to succeed, when early performed, than in any of the complicated states, inasmuch as the infiltration of the submucous tissues is generally confined to the larynx. It should be kept in view, that this and the complicated states of the disease, being characterized originally by deficient vital power and a morbid condition of the blood, will rapidly become worse in both these respects; and that, if this operation be not resorted to at a very early period, the consequences of delay pointed out above will the more readily supervene, and the chances of success from it be remarkably reduced. If purgatives be resorted to at any period of the asthenic forms of laryngitis, — and they will be required in many cases — they should be combined with warm, tonic, and stomachic substances, and their operation be promoted by stimulating and antispasmodic enemata. Or enemata may, in many instances, be confided in chiefly, in order to evacuate the bowels. Spirits of turpentine with castor oil, — sometimes with common salt — or with camphor, assafœtida, &c., according to circumstances — generally are the most efficacious, and most appropriate to the states of the disease.

99. D. *Treatment of Chronic Laryngitis.* The *indications* of cure in the *primary form* of chronic laryngitis are: — 1st. To remove the inflammatory action and its consequences in the larynx: — 2d. To improve the general health, and 3d. To relieve urgent symptoms. — *a.* In order that the *first* of these intentions should be the more readily accomplished, as well as to prevent exacerbations of the disease, or accessions of severe cough or spasm of the glottis, the patient should avoid exposure to cold air, and other causes of irritation, particularly dust, smoke, fumes, gases, and every exertion of voice or speech. He should *rest* the organ as much as possible, and speak only when it is necessary, and then in a whisper merely. M.M. TROUSSEAU and BELLOC think, that speaking in a whisper is attended by no evil. The patient ought to have recourse to a *respirator* on all occasions of passing from a warm to a colder air; and he should pay attention to his diet and regimen, shunning every thing that is difficult of digestion, or that may offend the stomach or bowels, or excite the circulation.

100. General *blood-letting* is sometimes required in this form of the disease, and chiefly in plethoric and robust persons at the commencement of the disease, or when the chronic symptoms become aggravated into a more acute state. Local depletion by *cupping*, or by *leeches* applied to the sides of the neck, below the level of the larynx, are however more frequently of use, particularly when pain or tenderness of the larynx is felt, and they should then be employed with decision. If the disease has been consequent upon suppression of the menstrual or hæmorrhoidal discharge, leeches should be applied to the tops of the thighs, or to the anus.

101. External *derivation* or revulsion is more beneficial than vascular depletions when the disease has been of some standing, a recourse to which should then be contingent only upon certain circumstances. Various means of derivation have been advised, and each has been in vogue for a time. First the tartar-emetic ointment was employed, especially in this country; and then moxas were recommended, on the Continent particularly. Afterwards frictions with croton oil were advised, and various liniments and embrocations containing liquid ammonia. Besides these, blisters, the liquor lyttæ, mustard cataplasms, &c., were resorted to; and there are few of these which have not given temporary ease in a few cases, or have either been of no avail, or aggravated the malady, in others. The general error was that they have been applied either over, or too near, the larynx — too close to the seat of irritation to derive from or subdue it; and hence from their proximity rather administering to its duration than arresting it. These, if employed at all, should be applied at a distance from the larynx, as on the sides or nape of the neck, or top of the sternum as advised by me in the article CROUP (§ 46.). The only application that can be prescribed with advantage on the throat itself is the terebinthinate embrocation mentioned above; and the inhalation of the fumes from it, especially when their escape is moderated by a covering external to the flannel with which it is applied, is generally beneficial. A caustic, mezereon, or pea-issue, setons, or open blisters, or a pustular eruption produced by means of tartar-emetic ointment, and kept freely suppurating or

discharging in the nape or sides of the neck, or at the top of the sternum, are the most deserving notice, of the various modes of procuring a continued purulent discharge.

102. Most British physicians have recommended a mild *mercurial course*, in order to fulfil the first indication of cure; and in a few primary cases it has been successful, although a more severe course, and the contingencies connected with it, have in some instances even caused the disease, especially in those exposed to atmospheric vicissitudes and in the intemperate. M.M. TROUSSEAU and BELLOC adduce several cases of the success of a general mercurial treatment, even when the disease was not of the syphilitic species; and state that many cases truly desperate were cured by giving mercury to salivation. When the practice is determined upon, calomel may be given, triturated with sugar, in small or moderate doses, and in the form of linctus or electuary, so that it may come in contact with the pharynx and spiglottis; and its use should be persisted in until the mouth becomes slightly affected, or salivation is produced. A diminution of pain, or of constriction of the larynx; an improvement of the voice, and a looser and easier cough, indicate the good effects of this course. If it fail, or cease to be further beneficial, a recourse to appropriate medicines, prescribed in the form of *linctus* or *electuary*, or in similar semifluid vehicles, is occasionally of service. Those which are demulcent and cooling are commonly to be preferred; and I have generally employed various syrups and mucilages containing small doses of nitre, or of hydrochlorate of ammonia, and of camphor or of benzoin, with narcotics and sedatives, according to the peculiarities of the case; taking care not to offend the stomach, or to disorder any of the several digestive processes. If these means do not afford decided benefit, the liquor potassæ may be given, with small doses of a solution of the iodide of potassium, and with camphor and narcotics, either in the form of mixture or linctus. The *inhalation* of vapour or steam imbued with the fumes of camphor, turpentine, narcotics, balsams, &c., as already advised by me for the chronic forms of BRONCHITIS (§ 98.), is sometimes of service, and is, as just remarked, one of the sources of the benefit afforded by the terebinthinate embrocations recommended to be applied to the neck and throat in this disease. *Narcotics* are generally useful in allaying irritation and cough. The extracts of *belladonna* and *stramonium* may be added to the warm fluids used for the purposes of the inhalation of their steam, or they may be applied by friction to the anterior part of the neck. The salts of morphia may also be employed endermically on the back or nape of the neck.

103. The above treatment will generally remove the primary form of chronic laryngitis, if it have been adopted before extensive ulceration or destruction of the cartilages has taken place; and will sometimes be successful even in the specific or syphilitic form of the disease; but, when these lesions exist, slight hopes can be entertained from any mode of cure. MM. TROUSSEAU and BELLOC have recommended a *topical plan of treatment.* They observe that whenever inflammation becomes chronic, and affects only a circumscribed part of the economy, it commonly resists the most extensive and active general treatment; and that, on the contrary, it is almost always modified by topical treatment, whatever be the means. This, to a certain extent, explains the difficulty with which internal local diseases are cured, compared with those which are external. They consider it therefore obvious that, if by any means local applications could be made to the mucous membrane of the *larynx* without interrupting respiration, many cases might be cured which are considered incurable; and this they believe that they have done.

104. The *inspiration of dry or moist vapours* has been recommended in *phthisis laryngea* and in other affections of the respiratory apparatus; but those which have been employed — and often too empirically prescribed—have been either too acrid, stimulating and concentrated; and not being confined in their operation to the larynx, but acting upon the respiratory surfaces generally, have proved more injurious than beneficial. The action of these cannot be limited; and hence those only which I have advised above, and in the article BRONCHI (*chronic inflammation of*), and which are balsamic, aromatic, emollient, and narcotic, and cannot injure the lungs, should only be employed. MM. TROUSSEAU and BELLOC confine themselves to those which I had advised in the above article, long before the publication of their work; but they recommend still more active, and more strictly topical means consisting of both *liquid* and *dry applications*.

105. The *liquid applications* used by these writers, consist of solutions of nitrate of silver, corrosive sublimate, sulphate of copper, and pernitrate of mercury. They prefer, however, the solution of nitrate of silver, from the application of which no inconvenience has arisen. The solution of corrosive sublimate, of the strength of from one to eight grains to the ounce of distilled water, they found to be very serviceable in some cases of syphilitic ulceration. The solution of nitrate of silver, in the large proportion of from one to two parts, in four parts of distilled water, they apply to and behind the epiglottis, by a small roll of paper bent at its moistened end, or with a small piece of sponge fixed to a rod of whale-bone bent, at an inch from the sponge, at an angle of 80 degrees. The patient's mouth being opened wide, and the tongue pressed down, the sponge is passed to the top of the pharynx; and as soon as it reaches it, a movement of deglutition is produced, which carries the larynx upwards, at which movement the sponge is brought forward and squeezed under the epiglottis, and the solution freely enters the larynx. Convulsive cough and sometimes vomiting ensue; but the application causes no pain. MM. TROUSSEAU and BELLOC have another means of effecting their object. To a small syringe, like ANEL's, a canula, at least five inches in length, and curved at its free extremity, is attached. The syringe is filled three-fourths with air, and one-fourth with a solution of the nitrate of silver. The canula is then introduced into the posterior fauces, opposite the larynx, and the piston being rapidly advanced, the liquid, mixed with the air in the syringe, falls in a fine shower on the superior part of the larynx and œsophagus. The patient is immediately seized with a violent fit of cough, which, however, need give no alarm. He is then immediately directed to gargle his throat with water

acidulated with muriatic acid or with salt water, which decomposes that portion of the solution which is not combined with the tissues.

106. *Applications in the form of powder* to the larynx, have likewise been recommended by MM. TROUSSEAU and BELLOC. Among these may be mentioned, in an inverse ratio to their power,—the sub-nitrate of bismuth, alum, acetate of lead, sulphate of zinc, sulphate of copper. Calomel and red precipitate also produce remarkable results in cases of ulceration, whether syphilitic or not, of the mucous membrane of the larynx. All these, excepting the sub-nitrate of bismuth, which may be applied pure, ought to be mixed with finely powdered sugar or sugar-candy in variable proportions, according to their activity: calomel with twelve times its weight of sugar; red precipitate, sulphate of zinc, and sulphate of copper, each with thirty-six times its weight; alum with twice its weight; and acetate of lead with seven times its weight of sugar; and nitrate of silver with twenty-two, thirty-six, or seventy-two times, its weight of sugar. The last is said to be most successful in erythematous laryngitis with erosions or ulcerations. The powders should be impalpably fine; the least roughness or perceptible fragment of a crystal occasions such cough as expels the powder. The powder is put into one end of a reed or glass tube, and the other is carried back as far as possible into the mouth. After a full expiration, the patient closes his lips around the tube and inspires suddenly and forcibly through it, some of the powder being thereby carried into the larynx and trachea. The cough which the powder excites, is advised to be restrained, as much as possible, so as to prevent a too speedy expulsion of it. This mode of applying these powders may be resorted to twice or even oftener daily, according to the nature of the case; but the mercurial powders should not, especially at first, be applied oftener than twice or thrice a week.

107. *Applications to the pharynx* are often beneficial in chronic laryngitis; for it is well known that this disease often originates in the mucous membrane of the *throat* (see article THROAT), especially in the tonsils, fauces, &c., and extends to the pharynx and thence to the epiglottis and larynx; and that it is often caused by enlargement or relaxation of the *uvula*, often in connection with other affections of the throat. Caries even of the teeth may affect the pharynx and larynx. In such cases, the treatment should be directed to the primary affection. An elongated uvula should be shortened, and suitable gargles prescribed. BENNATI extols gargles of alum and sulphate of zinc. MM. TROUSSEAU and BELLOC prefer the nitrate of silver, and, when angina pharyngea coexists with chronic laryngitis, they touch, two or three times a week, the tonsils and arch of the palate with a pencil of nitrate of silver or a solution of the same; or they apply a powder consisting of six or eight grains of the salt to about a drachm of powdered sugar. A strong solution of corrosive sublimate or of sulphate of zinc fulfils the same intention. Even when the mucous surface of the posterior fauces or pharynx is not affected with inflammatory irritation, the same means have been useful in chronic laryngitis.

108. *b.* The *second indication*, viz., to improve the general health, is generally required, and without attention be paid to it, the local measures above advised may be employed in vain. The means which should be adopted in order to attain this end ought to vary with the circumstances, and especially with the origin and complications of individual cases. When indications of irritation are observed in the throat or pharynx, or when the uvula is elongated, the digestive functions will be rarely found undisordered. These should be improved by mild tonics and purgatives, and by stomachic aperients and alteratives. The compound steel mixture with liquor potassæ, or the iodide of potassium with liquor potassæ and sarsaparilla, are amongst the most suitable medicines that can be resorted to with this intention, after the secretions and excretions have been evacuated. A residence in a mild, equable and congenial climate, strict attention to diet and regimen, and the use of mild chalybeate and deobstruent mineral waters, will very materially assist other means of cure. When the laryngeal affection is dependent upon an early stage of pulmonary *tubercles*, these will be especially requisite, particularly change to a warm, mild and equable climate.

109. In the *syphilitic form* of the disease, the constitutional cachexia must be removed as already hinted at, by a mild mercurial course, or by a course of iodine and sarsaparilla. In this species, gargles or the local application to the larynx of solutions of corrosive sublimate, and the exhibition of this substance internally, in the form either of pills or of solution until the system is affected, or conjoining it with tonics, sarsaparilla, &c., are sometimes very advantageous.

110. *c.* The *third indication* — or the relief of urgent or dangerous symptoms, is often called for in the course of the disease. Several of the means already mentioned, and recommended to be conjoined with other remedies, intended to answer the *first* intention, as the internal and external use of narcotics, anodynes, and demulcents, particularly stramonium, belladonna, &c., (§ 99. *et seq.*), will be required to fulfil this indication. Still, however skilful the treatment may be, these and other combinations of means may fail to prevent, or accidents may occur to produce, impending suffocation. In cases where the epiglottis is so ulcerated, or otherwise injured as not sufficiently to protect the rima glottidis, articles of food or foreign bodies may become entangled in, or may pass, the larynx into the trachea; and these, or threatened suffocation from other circumstances, as from the sudden infiltration or abscess of the submucous tissues, may require *tracheotomy*. When this operation has been resorted to, and a canula of sufficient diameter introduced, the affection of the larynx should be treated in a suitable manner, care being taken, in the way above advised (§ 96.), not to allow secretions to accumulate in the trachea so as to interrupt respiration. When the organ is capable of performing its functions, the canula may be withdrawn, and the wound will soon afterwards heal. If the disease of the larynx be of such a nature that the air cannot pass through the glottis, the canula must be continually worn. MM. TROUSSEAU and BELLOC adduce an instance of its having been worn for ten years.

111. *Females* suffering under chronic laryngitis, often experience violent exacerbations and

laryngeal spasms sometimes threatening suffocation. In these cases, especially when occurring in hysterical temperaments, the application of the terebinthinate embrocation around the neck, or a belladonna plaster or ointment, and recourse to an enema of spirits of turpentine with castor oil, and sometimes with camphor or assafœtida, will generally remove the attack.

112. IV. FOREIGN BODIES IN THE LARYNX OR TRACHEA. — The consideration of this subject in connection with diseases of the windpipe, has been neglected by all writers on these diseases, excepting Dr. STOKES and Mr. RYLAND, although numerous instances of this accident, and minute accounts of the consequences produced by it, are on record. A somewhat particular notice of this subject has, however, been taken by PELLETAN, LOUIS, and PORTER. The situations in which the foreign body may remain, or into which it may pass, are — the rima glottidis itself; the ventricles of the larynx; the trachea; and the bronchial tubes, particularly the right. It may, from the efforts of coughing, be forced upwards into the trachea or larynx, thence to return again to its former position. The much greater frequency of the passage of the body into the right, than into the left bronchus has been imputed by DR. STOKES, not to the greater diameter of the right than of the left tube, but to the manner in which the trachea divides to form these tubes, the septum at the bifurcation not being in the mesian line, but decidedly to the left of it, so that a body falling through the trachea, will most readily pass into the right division.

113. When the body has passed into the air-passages, various results are observed: — 1st. It may be expelled forcibly through the glottis, after a period of time varying from a few moments to many years: — 2d. It may produce death by suffocation, from its being impacted in the larynx. — 3d. It may cause acute inflammation of the whole lung, owing to its lodgement in the principal bronchus, and the patient die before abscess is formed, or after an abscess has formed in the lung. — 4th. It may occasion symptoms of consumption, from which the patient may recover with the discharge of it, or from which he may die. These very different results arise chiefly from the various grades of organic sensibility of the bronchial tubes in different persons, from the state of predisposition to disease in the lungs, and from the size, nature, and form of the foreign body. In some cases, remarkable pain is produced by it, in others, extensive disease takes place without any pain.

114. It is remarked by Dr. STOKES that facts are wanting to throw light on the occurrence of pain, but that the chief cause of distress most probably will be found to reside in the degree of mechanical obstruction produced by the foreign body, the distress being always found to be great in proportion to the feebleness of murmur in the affected lung. Thus, if a smooth body, such as a bean, enters the bronchus, and so obstructs the tube as totally to prevent the entrance of air, the distress is extreme, the patient being suddenly deprived of the use of half of his lungs; while, on the other hand, an irregular body, as a tooth, may exist long in the same situation, with comparatively little distress, because, though to a certain extent obstructed, the tube is not impermeable. This writer observes that, in the great majority of cases in which chronic consumption was produced, the foreign body was of an irregular form. The patients escaped rapid death, because the air-passage was not completely obstructed, and their disease proceeded from the long-continued irritation caused by this body.

115. *A. Diagnosis of Foreign Bodies in the Windpipe.* — When any substance remains impacted in the larynx, the symptoms are at once most violent, distressing and strangulating, the breathing being croupy, pain in the larynx more or less severe, the cough incessant, and attended by paroxysms of suffocation. The violence of the symptoms will depend much upon the degree of mechanical obstruction and the nature of the body causing it. The foreign body may, owing to these circumstances, produce almost instant death; or it may be expelled after a shorter or longer period; or it may fall into the trachea or bronchus, and, after an interval of comparative ease, be succeeded either by a return of the laryngeal symptoms, or by acute or chronic inflammation of the lung. Hence cases of this accident may be divided, — 1st. Into those in which the foreign body has remained, from the first, entangled in the larynx; — 2d. Into those in which having passed this part, into the trachea or into a bronchus, it is driven upwards from the trachea to be temporarily caught in the larynx, again to descend into the trachea or bronchial tubes, producing alternations of suffering and comparative ease; — and 3d. Those in which the foreign body, having passed into the trachea or bronchus, produces either acute disease with severe suffering, or more chronic inflammation with slight or consumptive symptoms.

116. *a.* In the *first* of these cases, the sufferings are those stated above (§ 115.); or they may be of a less severe character, as when the body is lodged in the ventricles of the larynx, where it may remain for a considerable period, but not without producing inflammation and its consequences. M. PELLETAN instances the occurrence of a button-mould having fallen into the larynx, where it caused severe cough, and occasional attacks of suffocation. The trachea was opened, but, although the button was felt, it could not be extracted, until the cricoid cartilage was divided, and then it was taken from the left ventricle of the larynx. A soldier after drinking water from a pool was suddenly seized with symptoms of suffocation, and died whilst preparations were being made for tracheotomy. A leech was found in the right ventricle, and obstructing the glottis. The severity of the cough may occasion, in accidents of this nature, so great disturbance of the cerebral circulation as to produce apoplexy, or convulsions, according to the age of the patient; and death may follow from this circumstance, after the foreign body has been removed.

117. *b.* In the *second class* of cases, or in those in which the body passes into the trachea or bronchus, and is occasionally driven up, on expiration, against the larynx, or is caught in it, the greatest variety of symptoms may be produced, and intervals of ease may take place. When fever appears, it is consecutive upon the local irritation, and the paroxysms of suffering are induced either by the body being driven into the larynx, or by its being impacted into a principal bronchus so as to suddenly deprive the patient of one lung. From

the secretion of mucus consequent upon the irritation caused by it, a rattling takes place in the throat. As the disease proceeds respiration becomes stridulous, but the sound, according to Mr. PORTER, is never so loud or so harsh as in croup. M. LOUIS has noticed the occurrence of emphysema above the clavicles. M. LESCURE has adduced a case in which the lungs were emphysematous throughout. I have met with emphysema above the clavicles in one case of this kind, in a child about eight or nine years of age. Dr. STOKES considers it a rare symptom. The following *case* by this physician is interesting and illustrative of this subject.

118. A gentleman, aged 20, in previous health, while conversing in the act of eating a piece of cheese after dinner, suddenly fell from his chair in a state of insensibility. A probang was speedily passed into the œsophagus on the supposition that a foreign body had lodged there, and in a few minutes he partially recovered. The attack recurred soon after with great violence; the face was congested, and the breathing spasmodic and stertorous. He was then freely bled, but no improvement followed. A loud rattling in the throat was heard, the patient tossed himself on the bed, and threw his arms about so as to expand the chest as much as possible. All the muscles of inspiration were in violent action, and the surface of the body became pale and cold. Suspicion of asphyxia from tracheal obstruction being entertained, a stethoscopic examination was made. The chest sounded every where clear; but the vesicular murmur could scarcely be perceived in any portion of the lungs, the feebleness being equal and universal, notwithstanding that the patient made the most violent efforts at inspiration. A loud sonoro-mucous rattle, every moment increasing, was heard in the trachea, while the slight dilatation of the chest compared with the respiratory efforts clearly pointed out some obstruction in the windpipe. The failure of treatment calculated to relieve the brain, and the evident secretion into the trachea, as shown by the loud rattle at the top of the sternum, were strongly indicative of the symptoms not having been caused by spasm of the glottis, but by a morsel of food passed into the trachea. Tracheotomy was now performed, and a crucial incision made through the tube; and on the angular portions between the incisions being removed, a mass of pultaceous matter was forcibly ejected through the opening, with instantaneous and complete relief to the symptoms. Respiration became easy, the expansion of the lungs full and audible; the patient breathed through the glottis and quite recovered.

119. It may be mentioned here, that substances may pass into the trachea, during deglutition, through an ulcerated fistulous opening between the trachea and œsophagus, generally in the membranous portion of the former. Of this I have met with one case; and similar instances have been recorded by ZEVIANI, VAN DŒVEREN, and others. In these cases, the ulceration, terminating in perforation, may commence in either canal, but generally in the trachea, and is almost always preceded by tubercular cavities in the lungs. In these cases, the symptoms are not materially different from these just noticed, or to those about to be mentioned in connection with the passage of foreign matters into the bronchi. This occurrence takes place chiefly in the last stage of tubercular phthisis, complicated with ulceration of the trachea and larynx.

120. *c.* In the *third class* of cases, or those in which the foreign body passes into a principal bronchus, and occasions either acute disease and severe suffering, or chronic consumptive symptoms (§ 115.), the particular lesions, as well as the phenomena which result, are very diversified. These are chiefly — 1st. Acute or chronic inflammation of the trachea, or of the trachea and larynx; — 2d. Acute inflammation of the bronchus in which the body is lodged; — 3d. Bronchitis with hæmoptysis; — 4th. Acute pleuro-pneumonia; — 5th. Abscess of the lungs; — 6th. Asthmatic symptoms; — 7th. Acute or chronic phthisis.

121. When the foreign body is thus situated, the consequences, and the symptoms attending them, are very diversified in different cases, according to its situation and form. The diagnosis depends on a careful examination of the history and symptoms and physical signs of the case. Generally, the sudden occurrence of irritation in a large bronchus, commonly the right, in a patient who had presented no previous sign of thoracic disease, is evidence that a foreign body had passed into it. The situation of the foreign body is often pointed out by local pain, but not constantly, even when this body is of an irregular form and irritating nature. The physical signs depend upon — 1st, its situation; — 2d, the degree of obstruction it presents to the entrance of air; — and, 3d, the amount of irritation it occasions. If it remain in the trachea, these signs are more obscure than when it is lodged in one bronchus; for, in the former case, the respiratory murmur is obscure in both lungs, but in the latter it is obscure in one lung only; he obscuration being in proportion to the degree in which it obstructs the passage through the bronchus. Hence the murmur is greatly lessened, or altogether extinguished in the lung whose bronchus is thus obstructed, whilst the sound on percussion remains the same, and the opposite lung presents the puerile respiration. If, however, the obstruction of the bronchus continue for a considerable time, without the foreign body being dislodged, or driven upwards into the trachea, congestion or inflammation of the obstructed lung may take place, the air in its cells be absorbed, and that side of the chest become dull on percussion, especially when compared with the other side. Hence the suddenness of the irritation, the existence of it before the appearance of constitutional disturbance, and the completeness of the bronchial obstruction in a whole lung, should be viewed as indicative of the occurrence in question, and lead to a more minute examination of the history and state of the case.

122. *B. Prognosis.*—Whatever may be the effects produced by the foreign body, — and these will depend not only upon the physical properties of this body, but also upon the peculiarities of the individual, — these effects do not always cease upon the removal of it. However, this circumstance ought not to prevent the institution of measures for removing it; as, when it is removed, the means, which the manifestations of the effects produced by it will suggest, will then more readily be followed by beneficial results. The *issue*, it is obvious, will depend upon nume-

rous circumstances — upon the various consequences noticed above, — upon the nature, size, and situation of the foreign body, — upon the local and constitutional disturbance produced, — and upon the removal or presence of this body; it has, however, been unfavourable in a large proportion of cases.

123. *C.* The *treatment* of this accident depends upon the bulk of the obstructing body. In most instances *tracheotomy* should be resorted to early; particularly when the body is large, is lodged in the trachea or larynx, and when it is moveable from a bronchus into the trachea. If it be firmly lodged in a bronchus, and have caused the lesions usually consequent upon it when impacted in this part, little hopes can be entertained from the operation. *Emetics* have been recommended, but they rarely succeed unless the body be of a small size. If it be large, it may be forced upwards during vomiting and caught in the larynx, and produce suffocation. Owing to this reason, Dr. Stokes argues against having recourse to emetics, and advises an early resort to tracheotomy. I believe, however, that there is less risk from the use of emetics, or of an emetic, than he infers; but I agree with him in advising a recourse to the operation early, and before inflammatory action is developed. — On this subject the reader will consult with advantage the works of Mr. Ryland, Mr. Porter, and Dr. Stokes, and the other writings referred to in the *Bibliography* and *References*.

124. V. Of Tumours external to, and Compressing the Windpipe. — Some notice has been taken of these, in connection with the production of spasm of the glottis (§ 28. *et seq.*); it is, therefore, unnecessary to add more on this subject than to enumerate the kinds of tumour that may affect either the trachea or larynx, particularly the former. The effects of tumours upon the windpipe may be *mechanical* only, or chiefly *vital*, or resulting from their influence upon the nerves of the tube, or upon the circulation through the veins of the neck; or both mechanical and vital. The tumours may be injurious in these ways either with or without compression of the tube so as to diminish its calibre; much of the effects produced by them depending upon their situations, their influence on the nerves and blood vessels, and the sensibility of the patient. When they are situated *above* the sternum or clavicles they are less likely to occasion injurious or urgent pressure on the trachea, than when they are developed *under* the sternum or upper portion of the chest. Those usually met with in the *former* situation are — abscess of the neck, — enlargements of the lymphatic glands, — Bronchocele, — tumour consisting of aqueous cysts sometimes developed in the vicinity of the thyroid gland but not affecting it, and described under the name of hydrocele of the neck, by Maunoir and O'Beirne, — aneurism of the carotid or thyroid arteries, — and solid or malignant tumours of the neck. These may form without materially compressing or displacing the trachea, owing to the yielding nature of the parts external to them and the trachea. But those tumours which are formed *under* the sternum and are more deeply seated, are generally productive of more distress, by affecting the trachea in these modes in a severer manner. They not unfrequently rise *above* the sternum, but their injurious effects chiefly depend upon the unyielding state of the parts external to them, and the consequent pressure therefrom resulting. In this *latter* class may be comprised, — aneurisms of the aorta and innominata — enlargement of the bronchial glands — hypertrophy, abscess or other lesions of the thymus gland — tuberculous or melanotic alterations of the bronchial glands — cancerous, or fungoid tumours in the posterior mediastinum.

125. In these different circumstances, it is very rare to find evidence of compression of the trachea, without signs of further disturbance, particularly great distension of the veins, dysphagia, and paroxysms of dyspnœa or of threatened suffocation; but dysphagia, in some cases, and stridulous breathing in others, may be the most prominent disorder. Of the various tumours now mentioned, producing pressure on the trachea, the aneurismal most frequently simulate laryngeal disease. This Dr. Stokes explains by their greater frequency, their ascent in the neck, and their close relation to the windpipe. The stridulous breathing, caused by their pressure, like that of chronic laryngitis, is of variable intensity; and their influence on the recurrent nerve produces either attacks of spasm or aphonia, thereby more closely resembling laryngeal disease. The *direction* of the pressure produced by these tumours is most frequently lateral.

126. The *diagnosis* between laryngeal disease and the pressure of an aneurismal tumour on the trachea has been well stated by Dr. Stokes. The symptoms of the latter are, — 1st. *Evidence of internal pressure*, as signs of compression of one bronchus; deep-seated dysphagia; turgescence of one or both jugular veins; œdema of the neck; signs of displacement of the lung: — all these are not however generally present, but one or more of them are usually observed. 2d. *Evidence of solidity in the upper portion of the chest;* as dullness on percussion of the upper sternal or either clavicular regions; bronchial or tracheal respiration, in the situation of the dullness; and loud resonance of the voice in the same situation. 3d. *Proper signs of an aneurism:* pulsation or bellows-murmur in the sternal or clavicular regions. And 4th. *Difference of the radial pulse.* — Attention to these points will prevent an aneurism from being confounded with tracheal or laryngeal diseases.

Bibliog. and Refer. — *Morgagni*, De Sed. et Causis Morb. Epist. xv. art. 13. et Ep. xxviii. art. 9. 10. — *Stoll*, Ratio Medendi., vol. i. p. 257. — *Sandifort*, Museum Anatom., vol. i. p. 274. — *Frank*, Interpret. Clin., vol. i. p. 182. — *Wathen*, In Mem. of Med. Society of Lond., vol. i. art. 20. — *B. Rush*, Med. Observat. and Inquiries, vol. v. p. 96. — *M. Baillie*, Trans. of Society for Imp. of Med. and Chirurg. Knowledge, v. iii. — *A. Sauve*, Recherches sur la Phthisie Laryngée. 8vo. Paris, 1802. — *T. Cheyne*, The Pathology of the Larynx and Bronchia. 8vo. Edin. 1809., and Cyclop. of Pract. Med., vol. iii. *Laryngitis.* — *J. B. Cayol*, Recherches sur la Phthisie Trachéale. 8vo. Paris, 1810. — *Delpit*, Dict. Des Sc. Méd. art. (*Larynx*). T. xxvii. — *W. Sachse*, Beiträge zur Kenntniss der Kehlkopfs-und Luftröhrenschwindsuchten. 8vo. Haun. 1822. — *Bedingfield*, In Lond. Med. Repository, vol. v. p. 194. — *Fraser*, In Ibid., vol. v. p. 453. — *Farre*, Trans. of Med. and Chirurg. Soc., vol. iii. p. 84. et 333. — *Percival*, In Ibid., vol. iv. p. 300., and vol. x. p. 297. — *Arnold*, In Ibid., vol. ix. p. 31. — *Lawrence*, In Ibid., vol. vi. p. 234. — *Travers*, Ibid., vol. vii. p. 150. — *J. M. Hall*, In Ibid., vol. x. p. 166. — *Porter*, In Ibid., vol. xi. p. 414. — *Bayle*, Dict. des Sc. Méd. art. *Œdème de la Glotte.* — *Louis*, Recherches, &c., sur la Phthisie, &c., p. 254., et Recherches Anat. Pathol. — *Howship*, Pract. Observ., &c., p. 150. — *Wilson*, Trans. of Med. and Chirurg. Society, vol. v. — *Roberts*, Ibid., vol. vi. — *Wood*, Ibid., vol. xvii. p. 164. — *Hill*, Ed. Med. and Surg. Journ., vol. xii. — *Abercrombie*,

In Ibid., vol. xii. — *Hood*, Edin. Journ. of Med. Sciences, vol. iii. p. 47. (*Spasm of Glottis from enlarged Thymus*). —*Tacheron*, Recherches Anat. Pathology. T. i. — *White*, Dub. Hosp. Reports, vol. iv. p. 561. — *Graves* and *Stokes*, In Ibid., vol. v. p. 82. — *Marsh*, In Ibid., vol. v. p. 618. — *M'Namara*, In Ibid., vol. v. p. 583. — *Stevenson*, Trans. of Med. and Chirurg. Soc. of Edin., vol. ii. p. 128. — *Carmichael*, Treat. on the Venereal Disease, 2d ed. p. 174. — *C. Hawkins*, In Lond. Phys. and Med. Journ., vol. xlix. p. 273. (*Venereal ulcerations of the Larynx*). — *J. Webster*, In Ibid., vol. lvi. p. 430. — *Porter*, Pathol. of the Larynx and Trachea. 8vo. Dub. 1826. — *Montgomery*, In Dubl. Journ. of Med. Sciences. July, 1836. p. 431. — *Griffin*, In Ibid., vol. xii. p. 364. — *T. R. Blackley*, In Ibid., vol. xiii. p. 384. — *F. Ryland*, Treat. on Diseases and Injuries of the Larynx and Trachea. 8vo. Lond. 1837. — *Gendrin*, Hist. Anat. des Inflammat. T. i. p. 545. — *Andral*, Pathol. Anat. (Transl.), vol. ii. p. 482., et Clinique Méd., T. ii. p. 204. — *Cruveilhier*, Dict. de Méd. et Chirurg. Pratiques., art. *Laryngite*, et Anatomie Pathologique. Livr. v. pl. 2. — *Bouillaud*, Archives Génér. de Méd., T. vii. p. 178. — *Ferrus*, In Ibid., T. v. p. 539. (*Asphyxia, from Tumour in*). — *Bricheteau*, In Ibid., T. vi. p. 303. (*Destruction of Muscles of*). — *J. North*, Comment. on most Import. Dis. of Children, Ch. iv. p. 256. (*Spasm of Glottis*). — *R. Fletcher*, Med. Chirurg. Notes and Observat. 4to. 1831. p. 3. — *H. Ley*, On the Laryngismus Stridulus, 8vo. Lond. 1837. — *Cheyne*, Cyclop. of Pract. Med., vol. ii. — *M. Hall*, Lect. on the Nervous System, p. 76. (*Spasm of Glottis*).—*F. J. H. Albers*, Die Pathol. und Therapie der Kehlkopfskrankheiten. 8vo. Leip. 1829. — *Barde*, In Archives Gener. de Med., T. vi. p. 140. (*œdema*). — *A. Trousseau and H. Belloc*, Traité Pratique de la Phthisie Laryngée, &c. 8vo. Paris, 1837.; analysed in Edin. Med. and Surg. Journ., vol. xlviii. p. 461., and in Med. and Chirurg. Review, April 1838., p. 393. — *W. Kerr*, In Ibid., Ap. 1838. p. 344. (*Spasm of Glottis*). — *A. Campbell*, Transact. of Med. and Phys. Society of Calcutta, vol. vii. part ii. p. 468., and Ibid., vol. viii. part i. p. 18. (*One case terminated favourably from external application of Croton oil.*) — *Senn*, American Journ. of Med. Sciences, vol. vi. p. 223. — *Hirsch*, Brit. and For. Med. Rev. July, 1836. p. 237. — *Ibid.*, Oct. 1836., p. 554. (*Croton oil externally*). — *Kyll*, In Med. Chirurg. Rev. July, 1838. p. 228. (*Spasm of Glottis*). — *Roots*, In Ibid. Oct. 1836. p. 449. — *Dalmas*, Journ. Hebdomad. de Méd., T. ii. p. 384. — *W. Stokes*, Treatise on the Diagnosis and Treatment of Diseases of the Chest, &c. 8vo. Dub. 1837., p. 205. *et seq.* — *Hachmann*, Lancet. Jan. 13. 1838., p. 551. — *G. Burrows*, Med. Gazette. Oct. 7. 1837., p. 50. — Ibid., vol. xiii. p. 702—968. — *Armstrong*, Ibid. May 20. 1837. p. 274.

LEPROSY. — Synon. : *Lepra Tuberculosa ; Lepra Hebræorum ; Lepra Ægyptiaca ; L. Leontina ; L. Arabium ;* the *Tsarath* of Moses ; *ἐλεφαντίασις*, Aretæus ; *Elephantiasis Græcorum ; Elephantiasis*, Good, Cullen, Sagar ; *Leontiasis ; Lepra Nodosa ;* the *Djuzam*, or *Iuzam* of Arabian writers ; *Lepra Medii Ævi*, or *Leprosy* of Authors of the Middle Ages ; *Lepre Tuberculeuse ; Mal Rouge de Cayenne*, Fr. ; *Der Elefantenaussatz, der Aussatz die Feldsucht*, Germ. ; *Tubercular Leprosy ; Elephantiasis of the Greeks.*

Classif. — 3d *Class.*, 3d *Order* (Cullen). — 3d *Class* ; 4th *Order* (*Good*). — IV. Class IV. ; Order (*Author*).

1. Defin. — *Dusky red or livid tubercles of various sizes on the face, ears, and extremities ; thickened or rugous state of the skin, a diminution of its sensibility, and falling off of the hair, excepting that of the scalp ; hoarse, nasal, or lost voice ; ozæna ; ulcerations of the surface and extreme fœtor.*

2. Considerable confusion has arisen from not distinguishing this disease from *elephantia*, or elephant-leg, on the one hand, and from the squamous lepra, or *lepra Græcorum*, on the other, — diseases perfectly distinct from each other. Indeed, most of the tuberculous and scaly diseases, especially the *lepra* and *psoriasis* of Willan, were deemed *leprous* and received into the lazarettoes. The circumstance of the description in the books of Moses of several forms of cutaneous disease as being leprous, and the applicability of parts of that description to the above squamous affections, have contributed to this confusion. In order to simplify the subject, it will be preferable to consider the *true leprosy of the middle ages* entirely apart from the chronic scaly eruptions just mentioned ; and to view the lepra of Willan, as M. Schedel has done, as a species only of psoriasis, more especially as the appearance, nature, and treatment of both these squamous diseases are very nearly the same. I shall here briefly describe tubercular lepra, as it appears to have prevailed during the middle ages, and down to modern times in Europe, and as it is occasionally met with at the present day in some warm and eastern countries ; and afterwards notice certain modifications of it observed in various countries. I have viewed the *scaly lepra* as a species of *psoriasis.*

3. I. Description of Tubercular Lepra. — Several writers state that physical and moral languor and depression often precede the appearance of the disease in the skin. Occasionally the *spots* and *tubercles* characterizing the disease appear in the skin with febrile symptoms ; but the attack is more commonly very gradual and slow. Patches of the integuments are generally changed in colour, and assume a darker hue before the developement of the tubercles. The *spots* become even deeper in colour than the skin in the dark races ; and yellowish, or reddish, or livid, shining, and slightly elevated in whites. These spots are irregularly disseminated, and look as if they were full of oil, or covered with varnish (Adams). They are occasionally quite *insensible*, but more frequently feeling is not quite absent in them, although they may be compressed without pain. At first, sometimes, they are more sensible than the surrounding skin ; but this state, and the redness attending it, subside by degrees ; the flush being followed by a tawny or bronze colour. The spots, after being stationary for a period of various duration, are always succeeded by tubercles, some of which are cutaneous, others are seated in the cellular tissue underneath. The cutaneous tubercles are small, soft, round, reddish, or livid, varying in size between that of a pea and an olive. They appear on every part of the face, particularly the nose and ears, and on the legs, but in rare instances they have occurred on the legs only. Commonly in a few years they spread over the whole body, although they are more numerous in some parts than in others ; and the malady becomes more and more marked. Of all places, the face is most affected and most deformed by it. The visage is puffed ; the skin of the forehead is beset with tubercles, and marked by numbers of deep transverse furrows. The superciliary ridges are swollen, furrowed with oblique lines, and covered by nipple-like projections. The hair of the eye-brows and the cilia are lost. The lips become thick and shining ; the chin and concha of the ear enlarge, and are thickly covered with livid tumours. The lobe and alæ of the nose are generally even more seriously altered than the rest of the face : the nostrils are irregularly dilated, and the cheeks are swollen. The whole of the features, enlarged and distorted by the puffing of the subcutaneous cellular tissue and by the tubercles, present a frightful deformity.

4. Arrived at this stage, tuberculous lepra sometimes remains stationary for a very consider-

able period. The skin then seems principally implicated, the chief functions being but little disturbed. The time which elapses between the appearance of the first tubercles, and the developement of those which succeed them, varies exceedingly. Frequently they are rapidly evolved; but they never acquire a very large size. Subsequently, commonly after some years, the greater number of these tubercles inflame, and either suppurate or are resolved. Ulceration, according to M. RAYER, is preceded by an acute inflammatory state, during which the tubercles and the surrounding integuments become hot and red. The tubercles, which are ulcerated, soften and discharge a sanious pus, that dries up speedily, and forms adhering brown or blackish scabs, which rarely rise above the level of the skin. Sound cicatrices are formed under these scabs, in rare instances.

5. When the disease appears before the age of puberty, the growth of the beard, and of the hair upon the genitals and axillæ, is often prevented or checked. In some, however, the beard only is wanting. In adults, the beard, and the axillary and pubic hair occasionally, but very rarely the hair of the head, are lost. Frequently the sensibility of the skin is somewhat impaired, sometimes it is at first increased, occasionally not changed. As the disease advances, it is often very much impaired in the extremities, especially the lower. The tubercles on the upper extremities follow the same course as that above described. They are less numerous than on the face; and appear chiefly on the outer and posterior surfaces of the fore-arm. The hand is swollen, but is rarely the seat of tubercles; it is commonly livid, with less of the bronze cast than other parts of the body. The lower extremities and feet are similarly, but generally more severely affected. The hollow space of the sole is filled up by the swelling of the cellular substance, giving the feet a flat appearance. The tubercles of the buttocks are large, those of the soles are flattened. Ulceration of the tubercles of the legs is always slow of healing. The phalanges of the toes occasionally sphacelate, especially when the disease is complicated with serious internal lesion, and is tending to a fatal termination. The trunk of the body is seldom the seat of tubercles.

6. The mouth, the fauces, uvula, tonsils, pharynx, and nasal fossæ, are often studded with tubercles of a smaller size than those of the skin. A longitudinal band of tubercles frequently extends from the superior incisor teeth backwards, along the roof of the mouth to the uvula. The lingual veins are sometimes varicose. The pituitary membrane is generally inflamed, and secretes a sero-purulent fluid, the inflammation occasioning pain of the frontal sinuses, and ultimately caries of the cartilages and turbinated bones of the nose. The voice becomes hoarse, nasal, and is finally lost. The external parts only of the ears are affected; but these are enlarged, deformed, livid, and studded with tubercles. The sense of smell is early impaired, and soon altogether lost; especially when the pituitary membrane ulcerates and discharges a profuse fœtid secretion. The eyes are not materially affected, beyond the loss of the cilia. The sense of taste is not impaired. The pharynx becomes covered with tubercles, but the æsophagus is seldom thus affected. The stomach and bowels generally perform their functions regularly, unless they be disturbed by active medicines.

7. The organs of locomotion are generally much enfeebled. If the disease has commenced before puberty, the patient continues weakly, and gradually becomes deformed; but if manhood has been attained before its invasion, and the person is fully developed, the affection of the muscular system approaches, and proceeds slowly and gradually with the progress of the disease. The influence of the malady upon the generative organs has not been precisely determined. According to some writers the evolution of these organs is always arrested by it, when it occurs before puberty; and it causes them to fall into a state of atrophy when it appears after this period. PALLAS states that the Tartars affected with the malady show a distaste of sexual intercourse. All the patients M. RAYER saw had the genital organs well developed; and none of them was tormented by the *libido inexplebilis*, mentioned by some authors as a frequent concomitant of the disease.

8. *Terminations.* — Tuberculous lepra is seldom seen in Europe; hence its morbid anatomy has been imperfectly studied. But the most exact accounts which have been furnished concur in showing that persons who are the subjects of it are almost always carried off by acute or chronic inflammations of the respiratory organs and passages, and of the digestive viscera; and less frequently by low fever.

9. *On Dissection*, PEYER'S glands have been found enlarged; the intestinal tubercles ulcerated, or about to become so; and the mesenteric glands enlarged and tubercular, in persons who have died of the disease. Small cicatrices have also been observed in the intestines. The liver and spleen have not been materially altered. A thickened state of the mucous folds of the larynx, tubercles on the vocal chords, occasionally ulcers which had destroyed the ligaments, &c., and small ulcers of the mucous coat of the trachea, have been found after death, and account for the affection of the voice during life. The lungs generally contain crude or softened tubercles scattered through them. Three patients examined by M. RAYER, had the lungs thus affected. Others who have died at an advanced period of the disease have shown distinct marks of pneumonia. The organs of circulation, and the nervous centres, present nothing remarkable. In a coloured man, which I saw examined after death from this disease, the heart was smaller and softer than natural.

10. II. MALADIES ALLIED TO TUBERCULAR LEPROSY. — The *leprosy* of *Iceland*, as described by Dr. HOLLAND and others; that of the *Faroe Isles*, noticed by DEBES; the cases which occurred in the *Shetland Isles*, and mentioned by Drs. EDMONDSTON and SIMPSON; those observed by Dr. HEBERDEN and Dr. ADAMS in *Madeira*, as well as those still met with in *Africa* and in the *East* and *West Indies*, are identical with the disease now described — the leprosy of the middle ages. There can be no doubt of the disease being somewhat modified by endemic influences; and by modes of living and other circumstances proper to the individual, even in the same locality; but several maladies very distinct from it have been confounded with it,

although its tubercular character offered a sufficient distinction between them.

11. i. Lepra Taurica.—*Leprosy of the Crimea.*—*L. of the Cossacks.* Pallas, Gautier, and Martius, have described this disease, which they say was introduced by the Russian troops engaged in the war against Persia, into the Crimea. The description given of it by Von Martius shows that it is identical in its accession, course, progress, phenomena, and terminations with true tuberculous leprosy. It is therefore unnecessary to occupy my space with an account of it. The same remark applies to the *leprosy of Holstein*, as described by Dr. Struve.

12. ii. Lepra Anæsthesiaca.—This is supposed to be the *Baras* of Avicenna, and has been observed by Winterbottom, Robinson, and myself. It is characterized chiefly by remarkable absence of sensibility not only from the extremities, but also from the general surface; and by the comparative smoothness of the skin, and frequent absence of a tubercular state of the integuments. It is probable, however, that these are merely modified or extreme cases, in which the anæsthesia, and ulceration of the extremities are the prominent phenomena, and the tubercular changes less manifestly produced, or at a more advanced period of the malady. It is likewise very probable, that the several diseases, which were considered as *leprous* in remote ages, among the Jews, and in more recent times in Eastern and Inter-tropical countries, were more or less closely allied, and it is not unlikely that in these ages, and even in modern times, several squamous and cachectic maladies assumed a more inveterate and irremediable form, in consequence of the nature of the food used by their inhabitants, and that these maladies are not only remarkably modified from the states now presented by them in highly civilized countries, but, as respects some of them, are also thereby rendered specifically different.

13. When we consider, that the use of salt was by no means general in some countries, during the early and middle ages, that this substance was procured with difficulty in many countries, and is still scarce and valuable in several, even at the present day; that all kinds of animal food, even the richest and coarsest, flesh-meats and fish, were often eaten in a rancid or semi-putrid state; that they were rarely cured otherwise than by smoking, or by drying them in the air; that in many countries most of the food used during the greater part of the year was preserved in this manner, and that vegetable food was in most of them but little employed; that periods of scarcity, or of want of vegetable substances or of grain, often heightened the injurious influence of unwholesome animal food; that the clothing worn next the skin was generally woollen, and retentive of the secretions from the surface, thereby irritating and contaminating it; and that habits of personal cleanliness were very imperfectly adopted, it will not appear surprising that chronic cachectic maladies were of frequent occurrence in the ages and countries thus circumstanced; that they assumed various forms, with the nature and combination of the diversified causes producing them; and that they have changed their forms with changes in the intensity and concurrence of these causes.

14. The *Lepra Anæsthesiaca* has been described by Dr. Winterbottom and by Mr. Robinson, and their accounts of it agree in many respects with what I have seen of it in Africa. It commences in spots or patches, which are of a somewhat lighter shade of colour than that of the adjoining surface in blacks, and of a tawny colour in whites. These patches appear first in the feet, hands, legs and arms, and seldom on the face and trunk until a more advanced period. They sometimes seem slightly prominent from thickening of the several tissues of the skin; and they are shining rough and apparently wrinkled, from minute indented lines; but the wrinkles do not run into the surrounding skin. The hair—if any have previously existed in the seat of these patches,—fall out, or cease to grow in them. The patches are insensible, and extend slowly over the legs and arms to the trunk, until the extremities, and sometimes also the greater part of the surface of the body is more or less affected, and deprived of feeling. The affected surface is unperspirable, but neither itchy, nor painful, nor swollen. As the disease advances, the pulse becomes slow and soft, and the bowels constipated. The toes and fingers are benumbed as if with cold, shining, slightly swollen, and stiff. The soles of the feet and palms of the hands present hard and dry chaps; and a furfuraceous matter is deposited below the nails, raising them and causing ulceration around them. The legs and fore-arms next swell, and the skin becomes rough and chapped. Ulcers form on the metacarpal and metatarsal articulations, in the lines of flexion; and afterwards in the corresponding parts of the articulations of the larger joints. These ulcers enlarge and sphacelate, and the fingers and toes drop off. The lobes of the ears, the alæ nasi and the lips are in some cases thickened and enlarged, and ultimately ulcerated, discharging a thick viscid matter. As the malady is proceeding to this stage, tubercles form in many instances in the skin of the limbs, face, and sometimes of the trunk. As the small joints are penetrated by ulceration and fall off, so they heal up, and others are attacked in succession, until the limbs are deprived, one by one, of their extremities. The voice becomes hoarse and guttural, and ulceration sometimes attacks the throat, but in a less degree than in the more prominently tubercular form of the disease. Occasionally the extremities, cicatrised stumps, and portions of the skin, are thickened, tuberculated or ulcerated. Food is taken with an appetite and slowly digested. The intellectual as well as the vital functions are impaired and benumbed. The patient is apathetic and merely vegetates; yet he often lives for many years in the slighter or earlier stage of the malady, or even in the state of mutilation characterizing the far advanced stage. At last he is carried off by diarrhœa or dysentery.

15. The above account, which is chiefly from my own notes, is somewhat different from that given by Dr. Winterbottom, which, however, is confused and imperfect, and evidently owing to his having described as varieties, different stages merely of the same malady. Mr. Robinson has also, judging from my own observation, and from the accounts given by Dr. Ainslie, described as a distinct species what appears to be merely a modification of the disease, in which the anæsthesia, and the falling off of the fingers and toes, were the most prominent phenomena. He however

admits, that *tubercular changes* sometimes show themselves in the course of the *Anæsthetic* variety. This is agreeable to my own observation. As the cases which I saw in several parts of Africa, were modified, according to the stages of the malady, some approaching more closely to the anæsthesiac, others to the tubercular, I believe that the two forms of the disease insensibly pass into each other. Mr. Robinson mentions the occasional occurrence of the chief characteristics of both varieties in the same patient; and Dr. Ainslie remarks that he never met with a case of genuine leprosy which was not distinguished both by want of feeling in the extremities, and by tubercles. Both modifications are equally prolonged, and both make more rapid progress in the poor, ill-fed, old, and debilitated, than in the rich, well-fed, and young.

> "Denique sæpe hominem paullatim cernimus ire,
> Et membratim vitalem deperdere sensum:
> In pedibus primum digitos livescere et ungueis;
> Inde pedes et crura mori; post inde per artus
> Ire alios tractim gelidi vestigia leti."
> Lucretius, L. iii. 525.

16. iii. Jewish Leprosy. — The term *Berat* seems to have been applied by Moses generically, and to have included — 1st, *Boak*, a form of the disease not rendering the person affected by it unclean; 2d, *Berat lebena*, bright white berat; and 3d, *Berat cecha*, dusky berat, spreading in the skin. The *second* and *third* species he describes as being called *Tsorat*, venom or malignity, and as contagious. The form of *Berat*, called *Boak* by the Hebrews, seems to agree with the *lepra vulgaris* of Willan. Dr. Good considers the *third*, or *Berat cecha*, to be the same with the *lepra nigricans* of Willan and Bateman. It may be so, but there is no further proof of this than of its being the tuberculous or true leprosy of the middle ages. The *second* variety, or the *Berat lebena*, is probably the *Leuce*, or λευκη, of the Greeks, and the third species of *Vitiligo* of Celsus.

17. The Jewish leprosy has been assimilated to other diseases. Bartholinus, Leclerc, and others associate it with tubercular elephantiasis. Hillary and Adams think that it was the Frambæsia of Africa. Lorry and several others regard it as a distinct malady. It is impossible to form, from the scanty accounts furnished us, a just idea of the disease. It is, however, not unlikely that the term leprosy was applied by the Jewish priests to various cutaneous affections, particularly those which were of a chronic, self-contaminating, or contagious nature; and it is probable that *Frambæsia* was one of these, as well as other inveterate cutaneous maladies arising from the modes of living, the habits and circumstances of the Jews at that time, and of the Egyptians; and that these maladies have changed their characters, owing to changes in the nature and combinations of their exciting causes.

18. iv. The Radesyge, a disease very prevalent in Norway, has been considered by many as a variety of tuberculous leprosy, from its very close resemblance, in many of its symptoms, to that malady. But in the article on that disease I have shown it to be generically distinct — that its characters, course, and terminations are quite different from the leprosy of the middle ages. This is still more especially the case with Pellagra (which see).

19. The *spedalskhed*, a disease prevalent in the district of Bergen, in Norway, has been confounded with *radesyge*; but, from recent researches, it is fully proved that it is identical with the leprosy of the middle ages, or elephantiasis of the Greeks — with the leprosy still existing in Norway and in eastern countries, and hence quite distinct from the *radesyge*.

20. III. Diagnosis. *A.* — The term *leprosy* has been applied indiscriminately to the *elephantiasis* of the Greeks, the *lepra* of the Arabians; to the *leuce* of the Greeks, the *berus* of the Arabians, or the *leprosy* of the Jews; and to the slighter scaly affections to which the names *lepra* and *psoriasis* were given by the Greeks and moderns. It seems extremely probable that other diseases, perfectly distinct in their natures from one another, and from those alluded to, were often included under the generic appellation of leprosy, provided that they possessed the general characteristics of inveteracy, or a disposition to self contamination, or to propagate themselves by contact with the morbid matter secreted by them. This seems to have been the case, especially among the Jews and eastern races. From the very precise accounts furnished by the writers of the middle ages, particularly those subsequent to the Crusades, the term *leprosy* was applied with tolerable precision to the elephantiasis of the Greeks, — to the tubercular disease. The monk Theodoric, Lanfranc, Bernhard Gordon, De Chauliac, Gilbert, John of Gaddesden, and several others have described this malady, as it occurred during the 14th century, with more precision and minuteness than any modern writer. As Dr. J. Y. Simpson remarks, in his very learned paper on leprosy and leper-hospitals, the details which they, and some other writers of that period, have given of the chief characters of the disease, are altogether similar; and the symptoms are exactly those which distinguish the Greek elephantiasis. They also enter most minutely into all the local and constitutional symptoms, with the view of faithfully distinguishing the disease; and they point out the mode in which a suspected person ought to be examined, before the existence of a malady which is to consign him to a leper-hospital should be decided upon.

21. It seems, however, that the precision thus laudably cultivated by the earlier of the middle age medical writers was subsequently departed from; for, during the fifteenth and sixteenth centuries, all cutaneous eruptions of an obstinate character, or attended by ulcerations, were deemed leprous and received into lazar-houses, which were extremely numerous throughout all Europe, particularly in countries bordering on the Mediterranean.

22. As recently as the times of Horstius and Forestus (the close of the sixteenth century) persons affected by elephantiasis, scabies, psoriasis, or psora, or the lepra of the Greeks, were treated as *leprous* and received into those asyla. Even Riedlin, as late as the close of the seventeenth century, remarks that the patients admitted into the Leper Hospital at Vienna presented every species of cachectic disease, characterized by affections of the skin, or ulceration and gangrene. At the present day the term *leprous* is restricted by the medical men of this country, particularly to those varieties of squamous affections, which the Greeks denominated *lepra* (λεπρα); whilst, in Continental countries, and in the East

more especially, it has been applied to the *elephantiasis Græcorum*, the *tubercular leprosy*, or *lepra Arabum.* I have already stated my reason for removing the *scaly lepra*, or the *lepra* of the Greeks, and of WILLAN and BATEMAN, to the genus *psoriasis*, to which it properly belongs, and of restricting the term *leprosy* to the *tubercular disease*, the elephantiasis of the Greeks, the lepra of the Arabians, to which this term was strictly applied by the writers of the middle ages, and by most of the later writers, although several other cutaneous affections, besides the tubercular leprosy, were received into the *leper*, or *lazar-houses*, in more modern times. It is probable, however, that the strictness of diagnosis observed during the thirteenth and fourteenth centuries depended on the circumstance of the seclusion of the leprous being enforced, whilst subsequently persons suffering under chronic maladies supposed to be allied to leprosy, were allowed to enter, for the advantages of medical treatment, those leper institutions possessing the characters of an hospital, and where medical treatment was resorted to.

23. GUY DE CHAULIAC, the celebrated surgeon of the fourteenth century, assigns the following *six* symptoms as the most unequivocal of this malady : —" rotundity of the ears and eyes ; thickening and tuberosity of the eyebrows, with falling off of their hair ; dilatation and disfiguration of the nostrils externally, with stricture of them within and fœtidity of the lips ; voice raucous and nasal ; fœtidity of the breath and of the whole person, fixed and horrible satyr-like aspect." JOHN of GADDESDEN remarks that " no one is to be adjudged a leper and separated from mankind, until the figure and form of the face is actually changed. Hence, ulceration of the feet, or foul scabbing must not be considered as arguing the presence of leprosy, nor nodosities, unless they appear on the face and with the aforesaid conditions." GLANVILLE, another English author, who wrote in the fourteenth century, " De Proprietatibus Rerum," states, according to the translation of the vicar of Barkeley, that leprous persons " have redde whelkes and pymples in the face, out of whom oftenne runne blood and matter ; in such the noses swellen and ben grete ; the virtue of smelling faileth, and the brethe stynkyth ryht fowle." *** " The infectyd are unclene, spotyd, glemy, and guyttery : the nostryls ben stopyl, the wasen of the voys is rough, and the voys is horse, and the here falls." No recent, or even modern, writer has distinguished this malady with greater precision than the above early authors. The *Definition* of SAUVAGES is perfectly diagnostic of the malady : — " *Facies deformis tuberibus callosis, ozæna, raucedo ; cutis Elephantina, crassa, unctuosa ; in extremis artubus anæsthesia.*"

24. *B.* The difference between it and *Elephantia* —the *Elephantiasis of the Arabians,*— is very wide. This latter is not a tubercular malady, and commences in the lymphatic veins and sub-cutaneous cellular tissue, and not in the skin itself ; this latter structure being only consecutively altered, (see art. ELEPHANTIA, *or Elephantiasis of the Arabians.*)

25. C. The differences between *tubercular leprosy* and *tubercular venereal affections* are, chiefly, the appearance of leprosy in Europe very long before the venereal disease, and the characters which are peculiar to each. The blotches and tubercles of *leprosy* are of a shining brownish tint, of an oily look, soft, tawny, irregular, distinct, separated by fissures, and attended by a general puffiness, loss of hair, and occasionally by much insensibility of the skin. The tubercles of *syphilis* are red or livid, hard, developed in the substance of the corion, clustered together, not insensible, generally consequent upon venereal ulcers, and not attended by loss of the hair, of the parts which they affect.

26. IV. CAUSES.—M. RAYER remarks that, first observed in Egypt, then in Italy during the time of POMPEY, leprosy subsequently extended, and has since been seen in the four quarters of the globe. It spread over the whole of Europe like an epidemic during the middle ages, especially about the period of the Crusades. Since the commencement of the 17th century, this malady has gradually disappeared from the countries of Europe ; and is now confined to inter-tropical regions. It is more common among the poor than the rich ; in the indigent, and in strangers after residence in a warm country. It has been described by POCOCKE as it occurred in Asia Minor ; by PROSPER ALPINUS, DESGENETTES, and LARREY, in Egypt ; by BRUCE, in Abyssinia ; MARSDEN, in Sumatra ; MARSHALL, in Ceylon ; by ROBINSON and AINSLIE, in India ; by BERGERON, in Cayenne ; and by various writers in St. Domingo, Martinique, New Orleans, the Isle of France, Coast of Africa, &c. From these localities enjoying a warm, humid, and variable climate, M. RAYER concludes that such a climate is favourable to the developement of the malady. But it was as prevalent in northern as in warm countries during the middle ages ; and, although it has almost entirely disappeared from the former of these, it is probable that cases may still lurk in some European localities, the descendants of those who were subjects of the malady. The disease was prevalent in the Faroe Islands as late as 1676, when it was accurately described by DEBES, and its causes assigned with greater truth than by any modern writer. It continued also to occur in the Hebrides and in the Shetland Isles, long after it had entirely disappeared from the southern parts of Great Britain. BRAND mentions his observing it in the Shetland Isles in 1700 ; and as late as 1742, the Island of Papastour continued to be the place assigned for the seclusion of those affected by it. In 1736 and 37, this island contained five persons afflicted with this malady ; and an account of it was drawn up by the Rev. A. FISKEN at that time, and is in the possession of Mr. BARCLAY. It has been recently published by Dr. SIMPSON ; and it contains an extremely accurate description of this disease. In 1772 and 76, there was one case in this island ; and in the account furnished by Mr. RANNIE, Session-clerk, mention is made of a leprous woman in 1778, who died in the fields before a house could be built for her ; that about the same time there were leprous persons in the district of Watness ; and that the son and daughter of a man were infected and sent to the Hospital at Edinburgh. In 1798, a young man, a native of these Isles, was a considerable time in that Hospital, affected with this malady ; and in 1809, Dr. A. EDMONDSTON met with a case of it.

27. The *exciting causes* of this malady, once the most generally diffused, the most surely and slowly fatal, and the most permanent, of all those

which have prevailed, at any time in the human species, are veiled in obscurity. It appears to have been prevalent for several centuries; and, although it may not have been, for a considerable portion of that time, so common as syphilis and scurvy, which followed it in succession, yet it was more certainly fatal and dangerous than they to the posterity of those who became the subjects of it. That it was believed to have been contagious, is proved by the strenuous efforts made to seclude the diseased, and prevent their communication with the healthy. In the account, above alluded to, of the Shetland lepers, it is mentioned that "the disease is found by experiment to be very infectious, and seems also to run in the blood, most people that have taken it without infection from another, having been related to three families in the isle. It affects any age or sex, and young persons bear it longer than those of a more advanced age, some having lived ten years under it, others only two, some four, some six, &c.; but none ever recover after the symptoms fully appear."

28. The Rev. L. J. Debes, whose curious and rare work is now before me, assigns what appears, as I have already hinted (§ 13.) to have been the chief causes of this malady. "I find the cause of the leprosie to be the air and the dyet; for here is a pretty cold and moist air, which usually causeth the scurvy to those that lead a solitary life, and this hath a great affinity with leprosy. Besides the meat of all, specially of the poorer sort, is half rotten flesh or fish, all their nourishment in summer being likewise fresh fish and sweet milk, without any salt; wherefore he that is not of a strong and good complexion, may easily have his blood corrupted, the sickness gnawing itself through the body before it breaketh out, and when any one is so infected, he may easily give it to another that is of the same complexion with the sick."— "It has also been taken notice of, that two living together in marriage, though the one be found infected, they live together as before as long as one doth but murmur of it, till the magistrate doth separate them, and yet the sound remaineth uninfected, whereas another is often taken with the disease by a very little conversation." —(pp. 312, 313.)

29. Dr. Ainslie expresses a doubt of the contagious character of the disease; but he admits, with all others who have had opportunities of investigating the nature of the malady, that it is hereditary. On this subject Dr. A. Edmondston remarks that this disease is hereditary, "and has been transmitted to successive generations, without extending itself to individuals living under the same roof, or even to all the offspring of the same parents; nor does it seem to propagate itself by infection, unless in those cases where a matter is generated and discharged from the sores. This is the certain medium of communication, and an inattention to this circumstance has given rise to contradictory views of its nature."—(*Edin. Med. and Surg. Journ.* vol. vi. p. 164.) I believe that there is much truth in the latter part of this quotation;—I quite agree with this opinion of my late friend. He adds, at another part, "that it was propagated by contagion cannot admit of a doubt. We have seen that it prevailed very generally in the Shetland Isles about sixty-five years ago, and all the inhabitants were deeply impressed with a conviction of its contagious nature; and the history of the disease but too well confirms the accuracy of the opinion."

30. The investigations of Mr. Stewart at Tranquebar, where tubercular leprosy is very prevalent, has induced him to give the following as the results:—1st. That women are less liable to this malady than men:—2nd. That it is hereditary: —3rd. Its being contagious is extremely problematical: — 4th. That every leper, suffering from an advanced stage of the malady, doubts whether he is capable of propagating his species:— 5th. That a fish diet is found to render every symptom worse: — 6th. That poor living, want of cleanliness, mendicant misery, and exposure to cold and damp, are but too constant attendants of this dreadful affliction.

31. From my limited observation of this malady, chiefly in Africa, as well as from other sources of information, I believe that it owed its origin principally to the use of smoked, wind-dried, and semi-putrid or rancid flesh meats and fish, and of rancid oils; to the want or disuse of salt; to the use of unripe, or spoiled, or mouldy grain; to the want of vegetable productions as articles of diet; to inattention to personal cleanliness; to the nature of the clothing; and to the contact of the matter discharged from the leprous sores, when the disease was far advanced, and when the matter came in contact with the skins of those who were already predisposed to it by the modes of living alluded to, and by want of cleanliness.

32. V. Treatment.—Much good may be done by avoiding the presumed causes of the malady. The *cure*, when the disease is fully advanced, is hopeless; but in the early stages, it may be either entirely removed, particularly if it have recently commenced, or if the malady is confined to the extremities, or it may be arrested for many years in its progress. The Arabian physicians trusted chiefly to mercury. Dr. Hillary avoided mercury and prescribed sarsaparilla. Dr. Towne thought that antimonials afforded the greatest relief, and that mercury aggravated the disease. I believe, however, that the bi-chloride of mercury, given with the compound tincture of bark or with the compound decoction of sarsaparilla, so as to produce both a tonic and an alterative effect, is really of great service in the early stage of the malady. Dr. Ainslie always endeavoured, first to improve the health by nourishing diet, cleanliness, and exercise; and afterwards to act upon the disease by a cautious use of the bi-chloride of mercury and warm baths, supporting the frame at the same time by generous living. He also mentions the mineral acids and the combination of antimonials and aromatics with approbation. The Hindoo physicians consider the white oxide of arsenic as a powerful remedy for this disease; but Dr. Ainslie was disappointed in his trials of it. Of all the alterative and deobstruent remedies, he adds, employed by the native practitioners of India, none is of equal repute with the concrete milky juice of the *asclepias gigantea*, given with sulphur and continued for some weeks. Dr. Heberden states that he cured a patient in five months by means of a mixture of an ounce and a half of powdered cinchona, and half an ounce of powdered sassafras root, made into an electuary with syrup, the patient taking the size of a nutmeg twice daily. M. Rayer sup-

poses, however, that a recourse to these and other tonics, as arsenic, &c., is apt to kindle the internal inflammations which often carry off leprous patients.

33. Although I saw several cases of this disease in different parts of Africa, my residence in any one place did not exceed three or four months. I had not, in consequence, opportunities of observing the effects of treatment. But a few years ago I was consulted by a physician who had resided for some years in a warm climate and treated cases of this malady in all its stages. He had had patches of a tawny colour on his extremities, with thickening of the corion, and enlargement of the hair-bulbs and follicles, and loss of the hair of the parts. The patches were slightly insensible; and the sensibility of the toes and feet was somewhat impaired. When I saw him, he had been the subject of the affection during fifteen or sixteen years; and at an early part of the treatment, the patches in the upper extremities had nearly disappeared; but those in the lower continued, the highest being situated in the flexures of, and little above, the knees. He attributed the disease to contagion, and said that he fully recollected the occasion of his infection. The disease had retrograded by his attending to his general health, by his removal to a temperate and equable climate, and by the occasional use of the bi-chloride of mercury with sarsaparilla, or of small doses of Fowler's arsenical solution, other alteratives and tonics having been employed in the intervals. He subsequently had recourse to sulphur fumigating baths, and to various medicated warm-baths. His pulse was slow, soft, and weak; the impulse of the heart weak; and the complexion pale and unhealthy. The patches in the lower extremities had been stationary for about ten years; but, during that time, a few tubercles had formed in them, had broken, and, after continuing to discharge an ichorous matter, had healed up. The nails of the toes and of the fingers were affected as above mentioned. He complained of dyspeptic symptoms. I first prescribed for him the chlorate of potash in decoction of bark; and, subsequently, put him upon a course of iodide of potassium, with liquor potassæ, in the compound decoction of sarsaparilla. After this course was continued about six weeks, the above symptoms began to disappear, and within three months his skin and lower extremities were quite clean. Three years afterwards there was no return of the malady. This case was evidently one in which the *anæsthesia* was the most prominent phenomenon. Notwithstanding the success of these means, I believe, that, in the far advanced state of the malady, the *prognosis* of Holler — "Confirmata elephantiasis non curatur" (*De Morb. Inter.* p. 64.) — may be viewed as just.

Bibliog. and Refer. — *Lucretius*, De Rerum Natura, L. iii. et L. iv. — *Celsus*, Medicina, L. iii. L. 25. — *Galen*, Opera. De Arte Curat. ad *Glauconem*, L. ii. et De Compos. Medicam. Secund. Loca, L. v. — (Galen states that the disease was common in Alexandria, owing to the full and rich living, and the heat of the climate. He recommends in its early stages a variety of tonics, stimulants, and alteratives). — *Aretæus*, De Causis et Signis Morb. Edit. *Boerhaave*, p. 69. — *C. Plinii Sec.*, Hist. Mundi, L. xxvi. 4. et L. xxviii. 33—50. — *Cælius Aurelianus*, De Morb. Acut. et Chron. 4to. Amst. p. 492. — *Aetius*. Tetrab. iv. s. ii. c. 123.—*Oribasius*. Synops. L. vii. c. 51.— *Paulus Æginetæ*, De Re Medica. Fol. Par. 1532. L. iii. ch. i. — *Avicenna*, Canon. Medicinæ, L. iv. p. 130. Fol. Venet. 1564.—*Theodericus* et *Lanfrancus*. In Arte Chirurg. Scriptorum Collect., p. 175 et p. 207. Venet. 1546. — *Gilberti Anglici*, Compend. Medic. tam Morb. Univ. quam Particul., &c. Vienna, 1510. — *Joannis Anglici*, Praxis Medica, Rosa Anglica dicta, p. 1076. Edit. Schopffin, 1595. — *B. Gordon*, Lillium Medicinæ, &c. In *Op. Med.* p. 49. Lugd. 1574. — *Guy de Chauliac*, Chirurg. Tractatus Septem. — (*De Lepra.*) Venet. Fol. 1470. — *J. Fernelius*, Universa Med. p. 579. Geneva, 1680. — *Schenck*, Observ. Med., &c., p. 776. — *Stemfels*, De Elephantiasi Græcorum. 8vo. Marb. 1662. — *Zacutus Lusitanus*, Pr. Med. Hist. L. vi. n. i. *Prosper Alpinus*, Medicina Ægyptiorum, L. i. p. 56. (Describes the Elephantiasis of the Greeks, and the Eleph. of the Arabians). — *L. J. Debes*. A Description of the Islands and Inhabitants of Feroe, &c. Englished by J. S. 12mo. Lond. 1676. p. 312. — *Martin*, Voyage to St. Kilda. 1698—1749. p. 140.; and Philos. Trans. 1730. — *Pontoppidan*, Nat. Hist. of Norway, &c. Trans. Lond. 1755. p. 261. — *Turner*. Treatise of Dis. Incident to the Skin. Lond. 1736. p. 2. — *Lorry*. Tractatus De Morbis Cutaneis, p. 376. — *Plenck*. Doct. de Morb. Cutaneis, p. 67. — *Sauvages*. Nosolog. Method., T. v. p. 229. — *Pococke*. A Descript. of the East and other Countries. Fol. 1753. — *De Chamserue* et *Coquereau*, Recherches sur l'Etat actuel de la Lépre en Europe, &c. In Mém. de la Soc. Roy. de Med. T. v., p. 199. — *T. Heberden*, Med. Trans. of Roy., Coll. of Phys. vol. i. p. 35. — *Tode*, De Elephantiasi Norwegica. Haun. 1785. — *F. Ruette*, Essai sur l'Elephant. et les Mal. Lepreuses. 8vo. Par. 1802. — *Casan*, Mém. Soc. Med. d'Emulation. T. v., p. 102. — *T. Winterbottom*, Account of the Native Africans around Sierra Leone, &c., vol. ii. p. 50. 8vo. Lond. 1803. — *Adams*, Observ. on Morbid Poisons, 4to. Lond. 1807. p. 265. — *Alibert*, Descrip. des Maladies de la Peau. Paris, 1806. — *Jackson*, Account of Morocco. 8vo. 1810. — *T. Bateman*, Practical Synopsis of Cut. Diseases. 8vo. Lond. 6th ed. p. 413. — *Robinson*, Trans. of Med. and Chirurg. Soc. of Lond., vol. x. p. 27. — *Babington*, In Ibid., vol. i. p. 27. — *Lawrence*, In Ibid., vol. vi. — *Southey*, In Ibid., vol. vi. — *W. Ainslie*, Obs. on the Lepra Arabica, as it appears in India. Trans. of Roy. Asiatic Soc., vol. i. — *H. H. Wilson*, In Transact. of the Med. and Phys. Society of Calcutta, vol. i. p. 1. — *Wise*, In Ibid., vol. vii. p. 156. — *Pierquin*, Journ. des Progrès des Sc. Méd. T. xi. p. 140. — *M. Gaide*, Archives Gener. de Méd. T. xvii. p. 533. — *L. A. Struve*, Ueber die Aussätzige Krankhiet Holsteins. 8vo. Alt. 1820. — *H. Martius*, De Lepra Taurica. 8vo. Novr. 1827. — *Heineken*, On the Leprosy of Madeira. Edin. Med. and Surg. Journ., vol. xxvi. p. 15. — *H. Holland*, in Ibid., vol. viii. p. 202. — *Cazenave*, Sur l'Elephant. de Grecs. Journ. Hebdoniod. de Méd. T. iii. p. 146. — *P. Rayer*, Theor. and Pract. Treatise of the Dis. of the Skin. 2d ed. Trans. by Willis. 8vo. Lond. 1835. p. 740. — *J. Y. Simpson*, Not. of Leprosy and Leper Hospitals in Scotland and England. In Edin. Med. and Surg. Journ., vol. lvi. p. 301. — *J. A. Raisin*, Essai sur l'Eléphantiasis des Grecs. 4to. Paris, 1829. — *Joy*, Cyclop. of Pract. Med., vol. i. — *Von Vogel*, Encyclop. Wörterbuch. vol. x. Berl. 1834. (In most of recent works, the *Synonymes* and *Bibliography* appertaining to the different forms of *Elephantiasis* and *Lepra* are confounded together. I may again state, that in the above article I have confined myself to the consideration of the *Leprosy of the Middle Ages*, which is identical with the *Elephantiasis of the Greeks*, and the *Lepra of the Arabians*, a disease generally prevalent in Europe for some hundred years, and still met with in a few places, and in warm climates; that the *Elephantiasis of the Arabians*, *Elephantia*, *Elephant Leg*, *Barbadoes Leg*, *Egyptian Sarcocele*, &c., is altogether different from tubercular leprosy; and that the *scaly lepra*, the *lepra of the Greeks*, &c., is also distinct from both the foregoing maladies, and is merely a variety of *psoriasis* (*which see*). Doubtless, owing to the numerous causes above stated (§§ 13. 28.), cases of the last-named disease were often aggravated, and others would assume so modified an appearance, that some difficulty, particularly in the early stages of the first of these maladies, might exist in forming a diagnosis; and this difficulty would be increased by the slow progress of all of them, and by the opportunities of examining and observing them during their entire course, being frequently wanting.)

LEUCORRHŒA. — Synon: — *Fluor Albus*; — *λευκορροια* (from *λευκος*, white, and *ρεω*, I flow); *ῥοος γυναικειος*, Auct. Græc: — *Fluxio vulvæ*, Pliny. — *Ulcus Uteri*, Sennert. — *Cachexia Uterina*; *Menorrhagia Decolor*, Sauvages. — *Menorrhagia Alba*, Cullen. — *Blenorrhœa Uteri vel Vaginæ*; *Fluxio Vulvæ*; *Fluor Muliebris*; *Fluor Uterinus*; *Menstrua Alba*; *Catarrhus Genitalium*, *C. Vaginæ et Uteri*, Auct. Var. —

Hysterorrhœa Mucosa, Swediaur; *Medorrhœa Vaginæ et Uteri*, Frank. — *Fleurs Blanches, Catarrhe Uterin; Leucorrhée, Perte Blanche*, Fr. — *Das Weisse; Weisser Fluss*, Germ. — *Flusso Bianco*, Ital. — *Weakness, White Discharge, the Whites.*

CLASSIF: — 1. *Class*; 4. *Order* (*Cullen*): — 5. *Class*; 1. *Order* (*Good*): II. CLASS I. ORDER (*Author*)

1. DEFIN. — *A light-coloured discharge from the female genitals, varying in hue from a whitish or colourless, to a yellowish light green, or to a slightly red or brown; in consistence, from a limpid serum, to a tenacious ropy substance; and in quantity, from a slight increase of the healthy secretion to several ounces in the twenty-four hours.*

2. Various forms of this disease have been pointed out by writers, according to its presumed seat or source, and to the several circumstances connected with it. Most of the older writers treated it as a consequence of local relaxation, or of general debility. DEWEES viewed it as generally proceeding from local inflammatory excitement; PINEL considered that it was sometimes accidental, constitutional, and vicarious. Dr. CHURCHILL has described it with reference to its seat — as vaginal and uterine. Dr. FERGUSON has divided it into acute and chronic; and Dr. ASHWELL into the common, the inveterate and the symptomatic. Sir C. M. CLARKE arranged the varieties of leucorrhœa chiefly with reference to the character of the discharge, believing that the appearances presented by it are indicative not only of its source, but also of the state of vascular action and of structural lesion in that source. A somewhat similar mode was adopted by J. P. FRANK; but the arrangements of these two eminent physicians were formed more as a means of distinguishing the inflammatory and organic diseases of the female organs, than with reference to the functional disorders of these parts.

3. Leucorrhœa, in every form, and in most of the circumstances in which it occurs, is merely symptomatic, either of functional, inflammatory, or organic diseases of the female organs, or of disorder of the general health. It is unnecessary, therefore, at this place, to attempt to give a full account of the several states in which it appears in practice, as its chief symptomatic forms are necessarily comprised in the articles on the principal diseases of the *vagina* and *uterus*.

4. Leucorrhœa may occur at any period of life — from earliest infancy to advanced old age; but it is most frequent between the ages of 15 and 50. In childhood and early infancy discharges from the vagina and vulva are not infrequent, and are commonly the consequence of irritation or inflammatory action; the mucous membrane of the genitals partaking in the general disposition of mucous membranes to be irritated or inflamed at this period of life, and to furnish a copious mucous or muco-puriform secretion. About 45 years of age the disease becomes less frequent; and after 50 it is seldom observed, unless as a symptom of organic lesions of the uterus. In *childhood* the discharge proceeds from the *vagina* and pudenda, and is a *simple* and *primary* disease; in *old age* it is chiefly from the *uterus* and *os uteri*, and is generally *symptomatic*. During the period of *uterine activity*, it proceeds from either the *vagina*, the *os uteri*, or the internal surface of the *uterus* itself, or from any two, or all, of these situations; and is more frequently a consequence of pre-existing disorder than a primary affection. Owing not only to the situation or source of the discharge, but also to the state of vascular action and vital tone of the vessels which yield it, various appearances are presented by it; and hence, in the difficulty attending the investigation of the exact states of disease producing it, the importance of determining the connection of its several appearances with the particular morbid conditions upon which they respectively depend. The accomplishment of this object is not easy, nor probably can it be attained with great precision; still, if reached with even tolerable accuracy, it furnishes an important aid to the diagnosis, not only of the more primary states of this affection, but also of all the maladies of which this is symptomatic. Hence the attempts of J. P. FRANK and of Sir C. M. CLARKE to arrange uterine and vaginal diseases according to the appearances of the discharges attending them, have not been devoid of great practical utility.

5. It is most evident that, to ascertain the particular *part* or *parts* chiefly or solely furnishing the morbid secretion constituting leucorrhæa, is of equal importance with a knowledge of the state of *vascular action* and *vital tone* in that part; and, consequently, that both these objects should be made the principal pathological points or facts to which medical treatment ought to be directed; and, although both are attended with difficulties, still these difficulties should not prevent the examinations requisite to the attainment of satisfactory information. The *seat* or *source* of the discharge is therefore a matter of the first consideration, and hence becomes the most legitimate basis of an arrangement of its several forms. That the secretion is, in many instances, chiefly *vaginal*, is shown by the circumstance of pregnant females being often the subjects of it; although, even in them, it may partly proceed from the mucous follicles of the *os* or *cervix uteri*. That, again, the discharge may proceed from the inner surface of the *uterus* itself, is shown in some cases of *prolapsus uteri*, and by a variety of circumstances about to be noticed (§ 35.); and, as Dr. FERGUSON observes, there is no reason for doubting that other causes of irritation than those dependent on uterine disorganisation may likewise rouse the inner membrane of this viscus to unhealthy secretion. In severe forms of leucorrhœa, whether chronic or acute, the *cervix uteri* is rarely unaffected, being generally softer, larger, and moister, and not infrequently more sensitive, than natural. The portion, too, of the lining membrane extending through the *cervix* into the *orificium internum* is especially formed for active secretion: the palmæ plicatæ which radiate on it, and which become greatly developed in the progress of utero-gestation, and which pour forth such a quantity of mucus in the progress of labour, prove that it can be the seat of active secretion, and therefore of deviation of its natural function. That the discharge may proceed not only from the cavity of the uterus, but also even from the interior of the Fallopian tubes, appears to be shown by the histories of some cases, as more particularly mentioned by FRANK and others. In the following account of leu-

corrhœa, I shall describe its forms, with reference to their *seats* or *sources*, and to the *grades of action* characterising them.

6. I. Leucorrhœa Vulvæ — *Leucorrhœa Infantilis — Infantile Leucorrhœa.*—i. *Description.*— A discharge occasionally proceeds from the vulva and orifice of the vagina. In *children* it proceeds from the general surface of the external genitals, and more rarely from the vagina, unless in delicate and relaxed children, subject to catarrhal and bronchial affections, attended by a copious defluxion, when it assumes a catarrhal form, or in those affected with worms, or other causes of intestinal irritation. When this form occurs in *adults*, its source is often more partial or limited. In both children and adults it may assume either an *acute* or *sub-acute* inflammatory character, or a *chronic* state. In the *former* state, its commencement is evinced by itching or local uneasiness, and by scalding in passing water; and the surface of the vulva is somewhat swollen and red. This condition is soon followed by a colourless, thin, mucous discharge, which becomes more and more copious, thicker, and of a white or yellow hue. It is sometimes so acrid as to excoriate the surface, and even the skin at the margin of the vulva. There is little or no symptomatic fever. In delicate, sickly, and relaxed children, the symptoms are milder, and are more disposed to the *chronic form*, which, however, may supervene upon the *acute* or *sub-acute* attack. In *chronic* infantile leucorrhœa the discharge is more profuse, milky, or puriform, and is attended by less pain, smarting, or inconvenience. In cachectic, plethoric, and scrofulous children; in those confined in hospitals, or in crowded, ill-ventilated, and low apartments; or in the ill-fed and dirty, the disease may assume a very serious and totally different form, or may give rise to a state of phagedenic ulceration or gangrene, which is noticed in the article Vulva. Occasionally infantile leucorrhœa presents a *catarrhal form*, and is then sometimes associated with slight bronchitic or catarrhal fever, or even with ozæna. In these cases, the secretion from the mucous surfaces generally consists at first of a thin or watery mucus, and is thicker and more glutinous as the affection becomes more *chronic*. It is usually the result of irritation, and proceeds frequently from the vagina as well as from the vulva.

7. ii. *Treatment*. If the irritation be considerable, the parts should be fomented with a decoction of marsh-mallow leaves, or with any other emollient decoction, three or four times a day. After each fomentation, the black-wash, or a weak solution of the sulphate of zinc, or of the acetate of lead, may be applied. When the affection becomes *chronic* or obstinate, a lotion of nitrate of silver, of gr. vj to xij to the ounce of water, is the most efficacious. If the irritation extend up the vagina, a little of the lotion may be injected by means of a small syringe. The patient must be debarred from rubbing, or having recourse to friction of the parts, and be kept quiet. Care ought to be taken that the urine be not retained too long from fear of the smarting felt when passing it; and when smarting is much complained of, the vulva may be fomented or bathed with warm water or poppy decoction after each evacuation. Cooling, diaphoretic and aperient medicines may be given occasionally. The diet should be light and chiefly farinaceous, and the bed-clothes light. If there be any tendency to adhesion of the labia vulva, lint and a little ointment may be placed between them. The parts ought to be duly examined lest such adhesion should form. If they are early detected, they are readily destroyed by forcibly separating the labia.

8. II. Leucorrhœa Vaginæ.—*Vaginal Leucorrhœa.* — i. *Symptoms.* This form of the disease is sometimes *acute*, and very frequently *chronic.*—*A.* In the *acute form*, it is *simple vaginitis*, or inflammation of the mucous surface of the vagina; and, in the more severe forms, is with difficulty distinguished from specific inflammation of the vulva and vagina (see Vagina and Vulva, *Gonorrheal Inflamtion of*).—*a.* The earliest *symptoms* are a sense of heat or soreness in the vagina, often with itching of the external parts. To these are subsequently added pain or smarting, with a sensation of tightness as if the vagina were swollen. If the attack extend along the vagina, there is sometimes a feeling of weight or bearing down; or pains extending down the thighs. The discharge, consisting of a thin, acrid, and colourless fluid, appears soon after these symptoms—seldom later than a day or two; but it soon becomes thicker, whiter, or yellowish, more purulent and resembling cream. As the discharge increases, the uneasy symptoms abate; and it frequently continues varying in quantity and appearance, in a more *chronic* or *sub-acute* form. In the early part of the *acute* stage, the mucous membrane is swollen, and the canal of the vagina is diminished; and it is hot and tender; but these soon subside, as the discharge becomes copious. There is no breach of surface, nor erosions of the membrane. In some cases, the labia and vulva are swollen, and more rarely the glands in the groin are enlarged. When the complaint is slighter, the local symptoms are less severe, and little or no constitutional disturbance may attend it; but the more severe attacks are often accompanied with slight rigors or chills, followed by pain in the back and loins, by languor, thirst, and quick pulse, and costiveness, with high-coloured urine, and smarting on passing it.—The *terminations* of this state of the complaint are:— 1. In the gradual subsidence of the symptoms and diminution of the discharge. — 2. More frequently in chronic disorder, characterised chiefly by the continuance of the discharge, and of the languor.

9. *B.* The *diagnosis* of this state of leucorrhœa from *gonorrhœa* is frequently difficult, particularly when the requisite examinations are not permitted. Sir C. M. Clarke seems to think it impossible in most cases. M. Ricord, however, states, that it is easily determined by the aid of the *speculum uteri*. Whenever the peculiar erosions or minute superficial ulcers of the mucous membrane covering the cervix uteri, which have been noticed by M. Ricord, are discovered, there can be no doubt of the gonorrhœal origin of the disease. These erosions and small ulcers are met with, he states, in nineteen out of twenty cases of the gonorrhœal discharge. An urethral discharge is much more frequent in gonorrhœa than in simple acute leucorrhœa. M. Ricord states that, of two hundred cases of the former, eight in every twelve had the urethra affected. The glands of the groin are also much less frequently enlarged in leucorrhœa than in gonorrhœa. In general, the symptoms are

much more severe, the calls to pass water more frequent, and the pains attending it greater, the extension of the disease to the uterus much more common, with the symptoms indicative of such extension more acute, than in simple acute vaginal leucorrhœa (see art. VAGINA, &c.).

10. *C. Chronic Leucorrhœa Vaginæ* — chronic vaginitis of Dr. CHURCHILL — is a most common complaint. From the constitution and state of health of some females, and frequently owing to the continuance of the affection itself, it has been very generally viewed as a consequence of debility local or general — of local relaxation. But a closer attention will often show that the local affection is often the result either of simple or of inflammatory irritation, more especially at its commencement. In many cases also it commences in the acute form already noticed, and passes into the chronic, the acute state being sometimes slight or of short duration.

11. *a.* The *symptoms* of this form of leucorrœha are chiefly, a more or less colourless or whitish and bland discharge from the vagina. In some cases, however, it is of a deeper hue, being greenish, yellowish, or brownish, and occasionally so acrid as to excoriate the edges of the vulva, and in some cases the insides of the thighs. There is scarcely any increase of heat, and little or no pain or tenderness. The inguinal glands are not enlarged. The patient often complains of weakness and of languor, or weariness after exertion, particularly if the discharge be profuse. The countenance becomes pale, and, if the complaint be prolonged, weakness or aching of the loins, and various dyspeptic symptoms are felt. When vaginal leucorrhœa is neglected, it may, especially in its more acute states, extend to the os and cervix uteri, or even to the interior of the uterus. Ultimately it may be followed by prolapsus, or descent of the uterus, and increased constitutional disorder.

12. *b. Diagnosis.*—Chronic vaginal leucorrhœa is distinguished : — 1st. From *gonorrhœa*, by the local irritation being much less in the former than in the latter ; by the absence of sympathetic enlargement of the inguinal glands ; by the whitish or colourless appearance of the discharge ; by the absence of irritation or discharge from the urethra, and of scalding on passing urine ; and by the less frequent calls to pass it : — 2d. From *uterine leucorrhœa*, by the absence of the more prominent and constant phenomena attending that form of the complaint, by its not being increased before or after the menstrual period ; and by the much less severe constitutional disturbance, and much less marked sympathetic phenomena.

13. *D. Causes of the Acute and Chronic vaginal Leucorrhœa.* — *a.* The causes of the *acute* or inflammatory state of this complaint are, chiefly, cold, violence, excessive indulgence ; the circumstances connected with the transition from the virgin to the married state, rape, exertion soon after delivery, inflammation extending from the vulva or labia ; high or rich living, in connexion with habitually sitting on hot cushions ; sitting on very cold seats, on stones, or on the ground, especially if accustomed to warm seats ; irritation from foreign bodies or stimulating injections, or from inflammatory hæmorrhoids, or other inflammatory diseases of the rectum. This form of the complaint is not frequent in unmarried and elderly females ; and it is much favoured by the habits, modes of living, and disposition of the patient.

14. *b.* The causes of the *chronic form* of the complaint are both *local* and constitutional or *general*. The local causes are the acute state of the disease ; irritations of various kinds, as of a pessary, or of excessive sexual excitement ; displacement of the womb ; frequent child-bearing, or abortions ; the irritation of worms in the rectum, hæmorrhoidal or other affections of the rectum ; the local application of cold when unaccustomed to it, or warm or relaxing ablutions or fomentations ; sitting and riding on warm cushions, and excessive indulgence in warm bathing. The *general* and constitutional causes are chiefly full and rich living and a neglect of exercise, favouring the determination of the circulating fluids to the genitals as duly insisted upon by Sir C. M. CLARKE ; the influence of cold and vicissitudes of season and weather on the frame, but more especially of warm, humid, and miasmal climates, as evinced among Europeans residing in the East Indies, and in other warm and intertropical countries ; the abuse of spirituous, and fermented liquors ; previous debility and debilitating diseases ; the excitement connected with hot and crowded rooms, with music, dancing, and mental impressions. The period of female life, during which this form of the complaint is most common, is from the appearance to the termination of the menstrual epoch of life — the term of uterine activity. It may however occur either before or subsequently to this term.

15. *E. Treatment.*— *a.* In the *acute state* of vaginal leucorrhæa, local or general vascular *depletion*, according to the age, habit of body and strength of the patient, may be prescribed. If the symptoms be acutely inflammatory this will be the more requisite, and should be aided by fomentations, by vaginal injections of warm water, and by hip-baths. Subsequently injections of a solution of acetate of lead, or of sulphate of zinc, may be resorted to. The patient should preserve the horizontal position, and sleep on a cool mattress, with light bed-clothes ; and the bowels ought to be kept gently open, by means of the cooling saline aperients. Refrigerant diaphoretics may also be prescribed. The diet should be light and spare ; and the beverages cooling.

16. *b. The chronic state* of vaginal leucorrhœa very rarely requires even local depletion. Much more frequently tonics and astringents, either vegetable or mineral, are found necessary, and, when the patient is debilitated or cachectic, they should not be neglected. The *Balsams*, especially copaiva balsam, have been recommended by many. I have often given, with much advantage, the copaiva and other balsams in the form of pills with magnesia ; and if this combination acted upon the bowels, I have added either small doses of *opium* or of the compound Ipecacuanha powder, or of the compound storax pill, with increased benefit. Dr. DEWEES has employed the tincture of cantharides ; I have had no experience of it in this complaint. It may probably be advantageously conjoined with the *tincture of the sesquichloride of iron*, which I have often prescribed with benefit in this disorder. Dr. BLUNDELL and others advise the *cubebs* in tincture or powder, and the compound tincture of *benzoin*. These, and other

tonics usually prescribed, are of great service when the complaint is limited to the vagina, and when there is irritation about the urethra; for the cubebs, benzoin, and even the balsams, operate chiefly upon the urinary passages. In many cases, however, they are inferior to the preparations of cinchona conjoined with mineral acids, or the sulphate of quinine. When there are marked debility, relaxation, and pallor, the combination of the sulphate of iron, quinine, camphor, &c., as in the following pills, is very beneficial: —

No. 286. ℞. Camphoræ rasæ, Ferri Sulphatis, Quininæ Sulphatis, āā, ℈j.; Ext. Anthemidis, ℈ij.; Balsami Peruviani, q. s. ut fiant Pilulæ xxxvj.; quarum capiat duas vel tres, bis terve quotidie.

17. Various *local means* have been resorted to with advantage; and, when the uterus is altogether unaffected, and the system is not predisposed to suffer from the sudden suppression of the discharge, they may be prescribed, but with more caution than I have known them to have been prescribed by several practitioners. Of these the most generally efficacious are the *decoction of oak-bark*, or of *cinchona*, or other astringent barks, with or without alum; and solutions of the *sulphate of zinc*, or of *alum*, or of *nitrate of silver*, thrown up by means of a suitable female syringe. The strength of these astringent solutions, usually advised, is frequently too great at the commencement of the treatment. I believe it to be more beneficial, as it is safer, to prescribe at first only one drachm of the first, half a drachm of the second, and a scruple of the third, of these salts to eight ounces of water, and gradually to increase the strength of the solution, according to circumstances. These injections should be employed at first tepid, and the temperature may be gradually reduced. They should be administered slowly, whilst the patient is in the recumbent position, and twice daily. During the treatment, the cold shower-bath, or the cold douche on the loins and hips, will be of service. The patient ought to take gentle and regular exercise in the open air, and attend to diet and to the state of the bowels.

18. Swelling and painful affections of the joints have been mentioned by Dr. Jewell, as having sometimes appeared after the sudden suppression of leucorrhœa by injections. I have met with still more serious, and even fatal, consequences resulting from the use of strong injections, particularly when the uterus has been affected. Some years ago especially such occurrences were not infrequent, for the excellence of a practitioner was too often considered great, particularly by coarse or vulgar minds, in proportion to his boldness or temerity; and even now, when the individual organs and members of the body are taken under the especial protection of their respective physicians — now, when there is a physician for the brain, another for the lungs, a third for the heart, a fourth for the liver, a fifth for the stomach, a sixth for the bowels, a seventh for the urinary organs, an eighth for the female organs, a ninth for the spine, and so on for every prominent viscus, feature, sense, and limb of the human microcosm, — now that the division of labour and the numerical calculations, which are applicable to mechanics, to political economy, and statistics have been transferred to medical practice by the small minds who are incapable of grasping any thing beyond a few palpable entities or obvious truths, or of extending their views to the numerous connections, combinations, and successive states of morbid action, — now when the scientific physician, who pursues his vocation with elevated ideas of its relations to all other branches of knowledge, and of its tendencies and objects, finds the very circumstances which improve his intellects, enlarge his views, and extend his mental vision to the more comprehensive, remote, and influential agents, relations, and results of disease, the strongest barriers he has to surmount in pursuing a successful career of practice, — now when ignorance, presumption, impertinence, absurdity, plausibility, and humbug play their several parts in forming the medical character, and in taking advantage of popular errors in the modes of exercising it, — and now when cant, rant, and quackery in religion, politics, government, and morals have infected the public mind, given currency to worthless pretension, and extended its influence to medical science, — the reflecting will not be surprised, nor will the judicious be disappointed, when they find physicians, whose minds are duly imbued with literature and science, and who believe that the human economy, both in health and in disease, can be successfully studied only as a whole, and in all its parts, relations, and connections, altogether overwhelmed by the crowd of noisy pretenders who obstruct the paths of science, knowledge, and honesty.

19. III. Leucorrhœa from Inflammatory Irritation of the mucous Glands of the Os and Cervix Uteri. — This *variety* of leucorrhœa was first distinguished and connected with its source by Sir C. M. Clarke. It is *characterized* by the white appearance of the discharge, by pain in the lowest part of the sacrum, and by the state of the os and cervix uteri.

20. *A.* The *symptoms* are aching or pain at the lower part of the sacrum, or at the os cocygis, and behind the pubis, increased by coughing, or straining, or other actions of the abdominal muscles, and by sexual intercourse. The bladder and rectum are often irritable; and menstruation is occasionally difficult. The discharge, particularly in the more acute cases or early stage, is opaque, white, and resembling in consistence a mixture of starch and water without heat, or thin cream. It is readily washed from the finger after an examination, and is capable of being diffused in water. It is often much thicker than cream, and very tenacious. In this case it does not flow off, but remains in the vagina until exertions to empty the rectum squeeze out at the same time the contents of the vagina. When it becomes more chronic it is often connected with some degree of *vaginal* discharge, by which it is rendered more fluid; and it may be associated with *uterine* leucorrhœa, when it will be attended by the characteristic signs (§ 27.), of that variety. An internal examination detects nothing unusual in the vagina, but the os and cervix uteri feel swollen and are very painful when pressed.

21. Although irritation or inflammatory action of the glandular apparatus of these parts may generally be attended by a white discharge, still it must be admitted that a similar discharge sometimes attends other sexual diseases, without the os and cervix uteri being materially affected. During the earlier stages of this affection, constitutional symptoms are either slight or absent; but, if the

complaint continue long, or if it be associated with discharge from the vagina or uterus, debility, pallor, and some degree of anæmia, difficult or scanty menstruation, costiveness, and various dyspeptic symptoms, commonly result. Sir C. M. Clarke suspects that this state of disease, particularly when neglected, sometimes precedes the more serious organic or malignant lesions to which this part is liable. This is not improbable, especially when the disease occurs, and proceeds unchecked, in faulty constitutions, and where there is a tendency to malignant or structural changes. The character of the discharge in connection with the state of the parts just mentioned, forms the *diagnosis* of the complaint.

22. *B.* The *causes* of this variety are those already mentioned (§ 13.), and more especially cold, irregular habits, excessive indulgences, especially after marriage, great muscular exertions, the suppression of the catamenia, mental excitement, high-seasoned food, late hours, balls, the other forms of Leucorrhœa, &c.

23. *C. Treatment.*— During an early stage of the complaint, *cupping* on the loins or sacrum, abstracting blood according to the severity of the symptoms and constitution, and habit of body of the patient, is generally requisite; and a repetition of it may be necessary. If the catamenia be difficult or scanty, a number of leeches should be applied below each groin a day or two before the expected return of this evacuation. The hip-bath, or fomentations to the lower parts of the abdomen and back, once or twice daily, will often afford additional relief. Injections of tepid water into the vagina three or four times a-day, or of a tepid decoction of poppy-heads, if pain continue or if the bladder be irritable, and the horizontal position, are generally beneficial. The bowels should be kept open by gentle and cooling aperients, such as the tartrate of potash, the super-tartrate of potash with confection of senna, or castor oil. Active purging, especially by resinous purgatives, ought to be avoided.

24. When this complaint becomes *chronic*, its removal is difficult, particularly if it be associated, as it often is, with uterine or vaginal leucorrhœa. In these cases, the horizontal position; frequent vaginal injections of tepid, anodyne, and gently astringent fluids; attention to the secretions and excretions, and particularly to the state of the bladder; regular, light, and spare diet, and alteratives suited to the peculiarities of the case, are usually required. I have seen benefit arise from the super-tartrate of potass, with precipitated sulphur, and either with confection of senna, or with any aromatic syrup, taken every night, so as to procure one copious pultaceous evacuation in the morning. If the bladder be irritable, demulcents, with the compound tincture of camphor and liquor potassæ, will be serviceable, particularly if aided by tepid anodyne injections. If tenesmus occur, a small cupping on the sacrum, and a starch enema, with a little syrup of poppies, will be of service. In other respects, the treatment may be much the same as that advised for uterine leucorrhœa (§ 41.).

25. IV. Uterine Leucorrhœa. — It is sometimes difficult to determine whether the discharge from the female organs proceeds from the vagina or from the uterus, or from both; still a tolerably accurate inference may be drawn, and it is often of consequence, as respects the treatment, that a correct opinion should be formed, as to this point. That the uterus often is the affected organ has been proved by the quantity of whitish or colourless fluid found in it after death, the female having been subject to leucorrhœa during life. Blattin states that, in nine cases out of twenty-four that he examined, the discharge proceeded from the uterus. The older writers believed that the uterus was the source of it in common with the vagina, without, however, stating the symptoms which are proper to the affection of this organ. Many modern authors entertain a similar opinion. Baglivi, Friend, Astruc, Manning, and Leake consider that the discharge proceeds chiefly from the uterus. Denman, Burns, and Hamilton distinguish, although briefly and imperfectly, the uterine and vaginal leucorrhœa. Dr. Locock thinks it difficult to establish a distinction, and does not attempt it. Dr. Blundell treats of vaginal leucorrhœa only; whilst Gardien, Capuron, Dugés, Lisfranc, and Nauche consider the complaint as one chiefly of the uterus. Siebold, Joerg, and Churchill have described the uterine variety at due length, and have insisted upon the importance of recognising the existence of the uterine affection. M. Marc d'Espine has given the results of his examinations with the *speculum* in 193 cases, and they have been referred to by some very recent writers, but without remarking that these examinations were entirely of patients in a venereal hospital — a circumstance that entirely vitiates his data, if made the basis of inferences as to the female community in general. Bearing, however, in mind the description of persons thus examined, the results may be worth recording. In 23 of 193 cases, the uterine orifice was found dry; in 40 there was only a drop of discharge in the orifice; and in 130 the discharge was abundant. The orifice itself was in some quite healthy and pale; in others, red, or deep red; and in some deep red, granulated, and bloody. The following table exhibits the character of the discharge, and the state of the uterine orifice in 111 cases.

	Orifice healthy.	*Orifice reddish.*	*Orifice deep red and granulated.*
Aqueous discharge	7	3	1
Albuminous transp. disch.	30	6	6
Albuminous semi-transparent disch. streaked blue, grey, or yellow	13	19	10
Opaque disch. streaked	3	7	6
	53	35	23

26. That it is important to explain the differences in the local and constitutional symptoms characterising uterine and vaginal leucorrhœa cannot be questioned, and these have been well shown by Dr. Churchill. That the discharge may proceed from both the uterus and vagina, in the same case, must be admitted; and that the vagina is seldom exempt when the uterus is affected, the discharge from the latter generally keeping up some degree of affection in the former, may also be conceded; still, a knowledge of the symptoms attending the affection of the uterus aids us remarkably in determining whether or not this organ is the chief source of the complaint.

27. *A. Symptoms.* Uterine leucorrhœa is a more or less profuse discharge of fluid from the internal surface of the uterus, varying in colour; and is

neither accompanied nor followed, necessarily, by organic change. It may affect females of all ages, from the time of approaching puberty; and it may assume *acute*, *sub-acute*, and *chronic forms;* the first and second of these states occurring chiefly in the young, robust, or middle-aged. It may occur in every temperament and habit of body; but with varying local and constitutional phenomena.

28. *a. Acute uterine Leucorrhœa* is not so rare an affection as Dr. CHURCHILL supposes. I have seen several cases of it; and, in some, the symptoms have been so severe as to amount to inflammatory action, the disease being rather hysteritis with copious discharge from the internal surface of the uterus, than simple uterine leucorrhœa. When gonorrhœa occurs in the female, it is very apt to extend to the uterus, and to simulate an extremely acute form of leucorrhœa, or to cause inflammation of the uterus. Acute uterine leucorrhœa is attended by considerable local suffering and constitutional disturbance: more or less pain or uneasiness is felt between the sacrum and pubis, or in the hypogastrium, and is increased upon firm pressure in the latter situation. The uneasiness extends to the perinæum and vulva; and the patient complains of dragging or uneasiness in the loins, sacrum, hips, and thighs, sometimes with frequent desire to pass water, or with spasmodic retention of it. These symptoms are generally increased by standing, walking, or exertion, and are often accompanied with hysterical symptoms, quickened pulse, and thirst. On examination per vaginam, the cervix uteri is sometimes tender to the touch, or slightly swollen. The discharge varies in quantity and appearance; it sometimes is copious, and evacuated in considerable quantity, affording marked relief, when it becomes scanty or ceases for a time; and it afterwards re-accumulates, and is discharged more abundantly. In these cases, the local and constitutional symptoms, varying much with the severity of the disease, and the state of the patient, indicate inflammatory irritation of, or vascular determination to, the internal surface of the uterus, with increased secretion in this situation. In some instances, the secretion seems to accumulate in the uterine cavity, and occasions an increase of the symptoms, especially of the uneasiness or pain in the vicinity of the uterus, and of the lassitude, malaise, and pains of the joints, before its discharge. In some instances, it has presented a puriform appearance, but it varies in different cases, and even in the same case.

29. *b.* The *sub-acute state* is merely a milder form of the preceding, and differs from it only in the greater mildness of the symptoms. If either this or the more acute state be not cured, it gradually subsides into the chronic, presenting, however, several exacerbations in its progress, particularly before or after the menstrual period, which it may in some cases even replace, with so marked an aggravation of all the symptoms, as to amount to a form of inflammation of the *uterus* described in the article on that organ.

30. *c. Chronic* uterine leucorrhœa is a very common complaint; and, although it occasionally follows the preceding states, it much more frequently commences in slight disorder, or with a mild state of the symptoms above enumerated. As the complaint proceeds, languor, weakness in the loins, head-ache, aching in the joints after exertion, pallor of the countenance, with a darker shade of colour under the eyes, and increased discharge from the genitals, especially at intervals, or shortly before or for some time after menstruation, are commonly present. When it has become persistent, or so chronic as to affect the general health, and especially if it have superseded the catamenial evacuation, the local and general symptoms are much more severe. A constant aching or pain is felt between the pubis and sacrum, with a sense of dragging in the loins, or of weight and occasionally of bearing down in the pelvis.

31. The patient now often complains of head-ache, of languor, and indisposition to exertion, of exhaustion after slight exertion, and sometimes of vertigo and faintness, which, with the head-ache, are owing to debility, and insufficient circulation in the brain. Pain is occasionally felt in the spine, or in the back of the head, and is unattended by intolerance of light and noise. Sympathetic pains are often felt in different parts. The tongue is loaded, sometimes dry, yellowish, pale, sodden, or flabby, and often indented by the teeth. The appetite is impaired or capricious; the bowels and liver become torpid or insufficiently active, the face pallid, the eyes sunken and surrounded by dark circles, and eruptions of *acne punctata* appear on the forehead and face. At last the pulse is small, quick, and weak; the surface is flabby and pale, the ankles swell, and the countenance is waxy, yellowish, or chlorotic.

32. On examination *per vaginam*, the body of the uterus feels somewhat enlarged. The os uteri is a little more open than in the healthy state; but its sensibility is not materially increased. The French practitioners, and a few British, who delight in the parade of this mode of research, inform us that the *speculum uteri* shews the *cervix uteri* pale, slightly rose-colour, deep-red, or spotted; yet I suspect that few reflecting physicians, will consider himself much enlightened by the discovery, or will be induced to prescribe according to the shade of colour thus detected. Yet, the greater the fuss, parade, and seeming pains evinced, with the apparent object of getting at the truth, especially when it lies deep, is not without its influence upon the mind of the patient; and the knowledge supposed to be obtained thereby is considered great in proportion to the trouble and difficulty of procuring it.

33. The discharge varies much in quantity. It is sometimes profuse. In most instances it is colourless and semi-transparent; in others it is opaque, and presents either a yellowish, greenish, or brownish tinge. It varies in consistency, from a very thin or watery mucus, to a gelatinous mucus resembling the white of a raw egg, or to a curdled-like matter in a few instances (HAMILTON, NAUCHE, &c.). It is usually bland; but Dr. CHURCHILL has observed it so acrid as to excoriate the labia and adjoining skin. I have observed this acridity in two instances of the complaint occurring in connection with the accession of the catamenia.

34. Chronic uterine leucorrhœa may *continue* for a very long period, and prove *inveterate*, however judicious the treatment may be. Its *duration* will depend upon the constitution of the patient, and the causes which occasioned it. If those causes continue in operation during the treatment, as is very frequently the case, the complete removal of the complaint is not only difficult, but

nearly impossible, until a change takes place in the patient's habits and feelings.

35. *B. Diagnosis.* — *a.* The *circumstances* more especially *diagnostic* of *uterine* leucorrhœa, are, as Dr. CHURCHILL has justly shown — 1. The occurrence of the discharge in young delicate females at one, two, or three of the monthly periods preceding the evolution of the catamenia; these causes indicating incipient activity of the uterus, with deficient vascular determination. — 2. The discharge of whites during subsequent monthly periods, where menstruation has been suppressed. — 3. An increased discharge during two or three days previous to menstruation, and immediately after it, in those cases where leucorrhœa is more persistent; in these, the leucorrhœa may gradually diminish the catamenia, until it entirely supersedes, or becomes vicarious of it. — 4. The occurrence of menorrhagia in connection with leucorrhœa, the latter preceding or following, or both preceding and following the former, sometimes in great abundance, and occasionally continuing during the intervals between the menorrhagia. — 5. The discharge of whites about the cessation of the menses, and the substitution of it for the menstrual evacuation. — 6. The appearance of leucorrhœa in place of the menses, in chlorotic females, as not infrequently observed. — 7. The termination of abortions, or of the coloured discharge attending them, in leucorrhœa. — 8. A similar transition of the lochia, after delivery, into the colourless secretion. — 9. To these I may add, the copious discharge of the morbid secretions at intervals, and sometimes after an exacerbation of the local symptoms; — and 10. The local and constitutional symptoms characterising this form of the complaint as above described. It should, however, be kept in recollection, that *uterine* and *vaginal* leucorrhœa both often coexist in the same case; that the glandular *irritation* of the *os* and *cervix uteri* (§ 19.), may be associated with either or with both; and that, although vaginal leucorrhœa may often exist alone, uterine leucorrhœa, especially in a chronic form, and when the fluid is at all acrid, will be accompanied with a discharge from the vagina, and occasionally even from the vulva also.

36. *b.* This variety is with difficulty distinguished from *uterine gonorrhœa*, unless the superficial erosions, described by M. RICORD, be present. Still attention to the history of the case, and the greater severity of the symptoms than even in the acute state of the complaint, will indicate its nature. In two cases of uterine gonorrhœa, which were treated by me in 1839 and 1841, and which occurred in recently married ladies, the symptoms were still more acute than those above described, and were consequent upon the affection of the vulva, urethra, and vagina. There were much heat, swelling, and pain in the parts, and in the region of the uterus; the uterine symptoms being exacerbated at intervals, and followed by a copious discharge of yellowish, opaque, puriform matter, occasionally coloured with blood, and generally increased immediately after the exacerbations. The discharge assumed a greenish hue after a time; and the disease subsequently appeared in the usual form of chronic uterine leucorrhœa, presenting many of the features of gleet in the male. The severity, character, and history of the case, and what has already been advanced on the subject, will generally disclose the nature of the complaint.

37. *c.* Inflammatory *irritation* of the *glandular apparatus of the os and cervix uteri* is distinguished from uterine leucorrhœa, by the regular white puriform discharge, and the tenderness of the part on pressure, these characteristics being only occasional or accidental in the latter. The slightest attention to the history of the case will prevent the discharge of the contents of an *abscess* of the uterus, ovary, cellular tissue, or adjoining parts, by the vagina, from being mistaken for this complaint.

38. *C.* The *causes* of uterine leucorrhœa are diversified, and are oftener inferred from various circumstances, than from direct testimony or satisfactory proofs. They are constitutional, local, and mental; and individual causes belonging to these classes of influences may be variously combined in their operations in different cases. Delicate, susceptible, and scrofulous persons seem most *predisposed* to this complaint; and the inordinate indulgence of the emotions, especially of the desires, often concurs with other causes in producing it. Local excitement, venereal excesses, masturbation, and sedentary habits, or indolence, are certainly influential agents in developing it. Fatigue, over-exertion, cold, humid, and miasmatous localities, sedentary occupations, frequent abortions or child-bearing, undue or prolonged suckling, the use of emmenagogues, or of stimulating injections, or of pessaries; a too rich, stimulating, full or heating diet and regimen; the suppression of other discharges; the too frequent use of resinous purgatives; and the irritation of intestinal worms, may severally, or in various combinations, be concerned in producing this form of leucorrhœa.

39. *D.* The *nature* of uterine leucorrhœa can hardly be mistaken. The concomitant signs of debility lead many to infer, that it is a disease of debility, and proceeds entirely from relaxation of the internal surface and parietes of the uterus. This may be the case, in some degree, especially after the complaint has continued for a considerable time. Others again believe, that the discharge is altogether owing to acute, sub-acute, or chronic inflammation of the internal surface of the womb, according to the forms it assumes; and that the local and constitutional symptoms are owing to these states of vascular action in the organ. Probably there are many cases, in which inflammatory action truly exists; and others in which debility, as respects the states of both the internal surface, and of the parietes of the organ, performs its part. Still I believe, that too much is imputed exclusively to the one or the other; and that a *third state,* not necessarily connected with either, although sometimes associated with one or the other, is most frequently concerned in producing the discharge. If the circumstances connected with the occurrence of the complaint be duly considered, there is much reason to infer that it is often owing to the vascular determination to the uterus and female organs, generally consequent upon the excitement or irritation of the nerves supplying these organs or parts; and that such excitement, and the vascular determination consequent upon it, are in some cases carried almost to the pitch of inflammatory action, as in the *acute* states; whilst in others, as in the more *chronic,* it is attended by impaired tone of the extreme vessels in

the internal surface of the organ, and probably also, in some instances, with deficient tone of the parietes of the organ itself. The importance of entertaining correct views as to the nature of the individual cases occurring in practice is manifest; for upon these views must the treatment be altogether based.

40. *E. Terminations.*— When uterine leucorrhæa is neglected, it may give rise to very serious diseases, both local and constitutional. Amenorrhœa, anæmia, chlorosis, sterility, phthisis, and even dropsy, are occasionally consequent upon neglected or protracted states of this affection. These contingencies should influence our *prognosis* in many instances; but generally a favourable result may be expected in the less protracted cases, and when the exciting causes are avoided.

41. *F. Treatment.* — On this subject, the observations of Dr. CHURCHILL are extremely just, especially as regards the use of astringent injections, and agree with those which I have promulgated for many years. — *a.* In the *acute* and *sub-acute states* of the complaint, the local abstraction of *blood* by *cupping* on the sacrum or loins, or by applying a number of leeches below both groins, or to the vulva, when the catamenia are scanty or suppressed, is generally requisite; and, in some cases, a repetition of the depletion is necessary. The hip-bath, and injections of warm water *per vaginam*, are subsequently of service. The bowels should be kept gently open by means of cooling aperients and laxatives, such as those mentioned above (§ 23.); and small doses of camphor, of the liquor ammoniæ acetatis and spiritus ætheris nitrici, to which small quantities either of the vinum ipecacuanhæ or of the liquor antimonii tartarisati, may be added according to circumstances, should be given every four or five hours. After the more acute symptoms have been removed by these remedies, the application of a blister on the sacrum, as advised by Dr. LEAKE and Dr. CHURCHILL, and the repetition of it oftener than once, if the case be obstinate, will be found of great service; or either of the *liniments* (No. 296. 298. 311.) in the APPENDIX may be kept applied, on two or three folds of flannel, as an embrocation.

42. *b.* In the *chronic state* of uterine leucorrhœa blisters on the sacrum, or the terebinthinated embrocation on the sacrum or loins, or on both; the occasional recourse to an enema with about an ounce of the spirits of turpentine; and the sulphate of quinine, with camphor and capsicum, in doses of about two or three grains of each, taken twice or thrice daily, are the means which I have found most beneficial. Dr. CHURCHILL states that the medicines which he has found most useful are — 1st, The balsam of copaiba, in pills or otherwise, increasing the dose from fifteen minims; 2d, The sulphate of iron with blue pill, or the compound rhubarb pill; 3d, Decoction of logwood; and 4th. The ergot of rye, in doses of five grains, three or four times a day.

43. The tincture of the sesquichloride of iron with tincture of cantharides; the sulphate of iron with camphor and rhubarb; and the sulphate of zinc with aromatics, &c., have severally been prescribed by me with advantage. *Iodine* has been advised by BRERA, GIMELLE, and SABLAIROLLES, especially in very chronic and obstinate cases. My experience of this medicine leads me to recommend a trial of it when the disease is associated with scanty or difficult menstruation, and when the system presents a pallid, anæmic or chlorotic appearance, and then the *iodide of iron**, and the preparations of *guaiacum*, will often be of service. — The *ergot of rye* has been recommended by ROCHE, DUFRENOIS, NEGRI, RYAN, and CHURCHILL, and may be given in larger doses than those prescribed by the last of these writers, conjoined with some aromatic powder or spice. It is most serviceable in those cases which are connected with menorrhagia or excessive menstrual discharge, in which cases I have found the *arsenical solution* also productive of great benefit. Besides these, the *ammonio-citrate*, or the *ammonio-tartrate of iron*, the preparations of *krameria* or of *uva ursi*, or of the *pareira brava*, or of the *diosma crenata*, may be employed, especially in the more obstinate cases. M. NAUCHE advises the use of *aromatics;* Dr. HUNT, of the *capsicum;* Drs. FISCHER, ROBERTON, and DEWEES, the tincture of *cantharides;* HECKER, the *cascarilla* bark; LANGE, camphor with oil of *amber* and nitre; MARCUS, the *aromatic sulphuric acid* of HALLER; LETTSOM, the *ammonio-chloride of iron*, in the infusion of *quassia;* HUFELAND the *muriate of lime;* RANOË, *cinchona* with *lime-water;* STOERCK and QUARIN, the *conium*, both by the mouth and in injections; WHITE, the *willow-bark;* and ZACUTUS LUSITANUS, the insertion of a *seton*, or *issues.*

44. An occasional recourse should be had to *aperients* of a stomachic and tonic kind, as the sulphate or super-sulphate of potash with rhubarb, or the compound infusions of gentian and senna; and the operation of these may be aided by suitable enemata. Advantage will often accrue from the use of *chalybeate mineral waters*, in connection with change of air; and from sponging the back, loins, and hips, and lower part of the abdomen, with tepid or cold salt and water, or vinegar and water. Afterwards the shower-bath, the cold *douche* on the loins, or cold sea-water bathing will be of service. Dr. LEAKE advised tonic infusions internally, blistering the sacrum, and the "use of the *Tunbridge*, or *Pyrmont* water for common drink: or the *artificial Spa water*, impregnated with iron and fixed air, as directed by Dr. PRIESTLEY." If these occasioned costiveness, he prescribed senna tea, or imperial drink with manna.

45. If pain or local irritation exist, the preparations of opium, henbane, or conium may be conjoined with the remedies prescribed, or may be administered in enemata. If the acridity of the discharge occasion excoriation of the labia, or of parts in the vicinity, *lotions* containing the acetate of lead, or sulphate of zinc, with vinum opii, may be used. The utmost care should be taken to wash away the morbid discharge by tepid *injections*, with or without small doses of anodynes, or the poppy decoction; yet no benefit will result, but, on the contrary, much risk may be incurred, in this variety of the disease, from employing astringent or stimulating injections *per vaginam*. I have been called to cases where recourse to these had been followed by inflammation of the uterus,

---

* This preparation, and the *Iodide of Sulphur*, were made by Mr. MORSON at my suggestion as early as 1826, and prescribed by me in various diseases since that time. The SYRUP is the best preparation of the *Iodide of Iron*, as all others are readily decomposed.

by the appearance of disease in the lungs, and other ill consequences.

46. Strict attention ought to be directed to the states of the digestive functions, and particularly of the bowels; and derangements of the menstrual discharge should be ascertained and removed.

47. The *diet* and *regimen* always require regulation. I have met with cases, particularly in connection with a too copious or too frequent menstrual discharge, which appeared to have been prolonged by a too full and stimulating diet, in connection with other indulgences. In these cases the quantity and quality of the *food* and *drink* of the patient should be strictly prescribed; and a separate sleeping apartment, and cool but sufficient clothing of the loins, hips, and limbs, early hours, and removal from the dissipations of the metropolis, ought to be directed, and continued according to circumstances.

Bibliog. and Refer. — *Hippocrates*, Opera. Ed. Fœs. pp. 566. 637. 621. — *Oribasius*, Synopsis, l. ix. c. 48, 49. — *Avicenna*, Canon. L. iii. Fen. 21. Tr. 3. c. 23. — *Primerosius*, De Morb. Mulieb. L. i. c. 8. — *E. Jorden*, A Rational Account of the Natural Weaknesses of Women. 8vo. Lond. 1620 — *T. Raynald*, The Birthe of Mankinde. Lond. 1634 — *Zacutus Lusitanus*, Med. Pract. Hist. t. i. l. iii. no. 11. — *Zacchias*, Quæst. Med. Leg. l. ix. tit. iii. quæst. 5. — *G. Charleton*, De Causis Catameniorum et Uteri Rheumatismo (Leucorrhæa). 8vo. Lond. 1685. — *Friend*, Emmenologia, p. 105. — *Morgagni*, De Sed. et Caus. Morb. Epist. xlvii. art. 11. 25, 26. — *Lange*, Miscell. Veritates, p. 77. — *Mauriceau*, Malad. des Femmes, &c. t. i. p. 457.; t. ii. p. 147. — *Stoerck*, Libellus de Cicuta, p. 107.; et Ann. Med. vol. ii. p. 213. — *J. Leake*, On Dis. of Women, &c. vol. i. p. 95. — *Stoll*, Rat. Med. P. vii. p. 155. — *Whytt*, Works, &c. p. 528. — *Ranoë*, In Acta Reg. Soc. Med. Hafn. vol. i. p. 436. — *Quarin*, Tentamina de Cicuta, Cas. 12. — *Trnka de Krozwiz*, Hist. Leucorrhæa. 8vo. Vindol. 1781 — *Lettsom*, In Mem. of Med. Society of Lond. vol. i. — *Cookson*, In Duncan's Med. Comment. &c. vol. iii. p. 88. — *G. A. Roederer*, Abhandlung von dem Wiessen Fluss der Frauen nach Raulin. 8vo. Nürn. 1793. — *White*, Observat. on the Willow, Bark, &c. 8vo. Bath, 1798. — *J. B. Blatin*, Du Catarrhe Uterin ou des Fleurs blanches. 8vo. Paris, 1801. — *Fischer*, Bemerk. über die Englische Geburtshülfe, no. iv. — *Joerdens*, In Hufeland Journ. d. Pr. Heilk. b. ix. st. i. p. 141. — *Hufeland*, In Ibid. b. xvii. sc. 3. p. 181. — *Roberton*, In Med. and Phys. Journ. vol. xv. p. 413 — *Thilenius*, In Hufeland Journ. d. Pr. Arzneyk, &c. b. xii. st. 3. p. 26. — *Marcus*, Magazin für die Spec. Therapie, b. ii. p. 374. — *G. W. Hecker*, der Weisse Fluss, &c. 8vo. Pirna, 1807. — *J. P. Frank*, De Cur. Hom. Morb. l. v. p. 250. — *C. M. Clarke*, Observat. on Dis. of Females attended with Discharges. 8vo. Lond. 1814.—1822. — *J. Latham*, In Med. Trans. of Coll. of Phys. vol. v. 1815. — *Pinel* and *Bricheteau*, Dict. des Sc. Med. t. xxviii. art. *Leucorrhæa* — *G. M. Sporer*, Catarrhus Genitalium pathologicé et therapeuticé Disquisitus. 8vo. Wien. 1820. — *V. Lepère*, Traité des Fleurs Blanches. 8vo. Paris, 1823. — *Lagneau*, Dict. de Med. t. xiii. p. 100. — *M. Nauche*, Des Maladies propres aux Femmes, 8vo. Paris, 1829. p. 288. — *W. P. Dewees*, Treatise on Dis. of Females, 8vo. Philad. 1828. p. 211. — *Boivin* et *Dugès*, Traité Prat. des Mal. de l'Uterus et de ses Annexes, &c. 2 tomes, 8vo. Paris, 1833. — *G. Jewel*, Pract. Observat. on Leucorrhœa, Fluor Albus, or "Weakness." 8vo. Lond. 1830. — *J. Balbirnie*, On Org. Dis. of the Womb, &c. 8vo. Lond. 1836. — *Marc d'Espine*, In Archives Génér. de Med. Fev. 1836. — *Locock*, In Cyclop. of Pract. Med. vol. iii. p. 34. — *F. Churchill*, Outlines of the Principal Dis. of Females. 8vo. Dubl. 1838.; and Med. and Chirurg. Rev., vol. xxix. p. 417. — *S. Ashwell*, A Pract. Treatise on the Dis. peculiar to Women, part. i. p. 158. (*See also the* Bibliog. *and* Refer. *to Arts.* Vagina & Uterus.)

LICHEN. — Syn. λειχην, *Papulæ; Papulæ siccæ; Petigo: Scabies sicca*, auct. var.: *Scabies agria; Scabrities, Licheniasis adultorum*, Young. *Exormia Lichen*, Good. *Der Zitterich, Flechte*, Germ. *Dartre pustuleuse miliaire; D. furfuracée volante poussée*, Fr. *Lichenous Rash.*

Classif. — 1. *Order*; 1. and 2. *Genus* (*Willan*). III. Class. I. Order (*Author*).

1. Defin. — *An eruption of papulæ of a red or white colour, clustered together or irregularly disseminated over the surface of the skin; attended or not with fever, or derangement of the digestive organs; usually terminating in slight desquamation, and very liable to recur.*

2. The term *lichen* was used by Hippocrates, perhaps in the same acceptation as it is at present; but this is uncertain. It was applied by modern writers to impetigo, and various other affections, till the time of Willan, who restricted it to a form of papular eruption, in which sense it has always since been employed.

3. I. Description. — In treating of this disease, I shall follow M. Biett, and his editors, MM. Cazenave and Schedel, in referring to the genus *lichen* the various papular affections generally included under the separate heads of *lichen* and *strophulus*, these differing little but in the period of life at which they occur.

4. According to this arrangement, lichen is divided into *two species*, *L. simplex* and *L. agrius*, and of these the several forms enumerated by authors are considered as *varieties*.

5. i. *Lichen simplex*. This consists in an eruption of minute papulæ of a red colour, often acuminated, but containing neither pus nor serum. The papulæ are distributed irregularly over the surface of the skin, and are attended with a sense of heat, itching, and tingling. They appear first on the face or arms, and in a few days extend to the trunk and lower extremities. The eruption usually lasts for seven or eight days, and terminates in scurf; it is seldom attended with any febrile symptoms unless when unusually abundant. The foregoing description applies to the acute form of lichen simplex. In some cases one crop of papulæ has no sooner disappeared than another is thrown out, and so on in succession for many weeks, or months, and sometimes even for years. The *varieties* of lichen simplex are: —

6. *a. L. pilaris.* In this the papulæ are developed at the roots of the small hairs which beset the surface of the skin. The eruption is almost always of a chronic character, and is accompanied with great irritability of the skin. Bateman says that it is not unfrequently connected with derangement of the digestive organs induced by ardent spirits.

7. *b. L. lividus.* This form is not common, and is nearly confined to constitutions broken down by want and misery, or to a cachectic habit of body. The eruption appears chiefly on the legs, and consists of dusky red papulæ interspersed with petechiæ differing little, if at all, from those of purpura simplex. The disease is often protracted through many weeks by the occurrence of successive erruptions. The papulæ when declining become of a dark brown colour, and finally disappear with slight exfoliation.

8. *c. L. circumscriptus.* Sometimes the papulæ of lichen, instead of being irregularly scattered over the surface, are collected in groups of a somewhat circular shape, having a well defined margin, and the disease then obtains the above name. The patches extend from their circumference by the development of new papulæ, while those at the centre disappear with slight

desquamation. The patches in this manner often coalesce, new ones are formed while the old are desquamating, and the disease may thus be prolonged for an indefinite period. This form of lichen occurs indifferently on the face, trunk, or extremities; it is most frequent in early youth.

9. *d. L. gyratus.* This name has been given by M. BIETT to a rare form of the disease, in which the papulæ are arranged in a kind of tortuous stripe or band. MM. CAZENAVE and SCHEDEL describe a case in which this band, commencing at the anterior part of the chest, passed along the inner side of the arm, following exactly the course of the ulnar nerve, and twisting on itself till it reached the extremity of the little finger. RAYER says he has seen it forming a kind of collar in front of the neck extending from one ear to the other.

10. *e. L. Urticatus.* In this the papulæ are much larger than in the preceding forms, and coalesce into wheals somewhat resembling the sting of a nettle. L. Urticatus is most frequent in children, but is occasionally met with in young persons of both sexes, and in females of more advanced age. It is usually confined to the neck and arms, but may also extend over the trunk and extremities. It sometimes disappears and recurs several times in succession, and is sometimes succeeded by a slight desquamation. It is occasionally attended with slight febrile symptoms, especially towards night, when the eruption causes more irritation. This form of lichen occurs principally in spring and autumn.

11. *g. L. strophulus.* This includes several varieties of papular disease, which are all most frequent in infants at the breast. The papulæ are sometimes red, irregularly scattered, and intermixed with small erythematous patches: this is the *strophulus intertinctus* of WILLAN and BATEMAN commonly called the *red gum.* Sometimes the papulæ are smaller but more numerous, and collected in large red patches, constituting the *strophulus confertus* of the above-named authors, and commonly called the *rank red gum.* Less frequently the eruption consists of small red patches of papulæ, which appear and desquamate successively on different parts of the body: this is the *strophulus volaticus* of WILLAN and BATEMAN. In other cases the papulæ are of a whitish colour, small, hard, rather elevated and sometimes, though rarely, surrounded with a slight redness: this is the *strophulus albidus.* At other times again the papulæ are of a whitish colour, but much larger, smooth, and glossy; this is called *strophulus candidus.* The two last varieties are known by the popular name of *white gum.* All the forms of L. strophulus are frequently connected with dentition, and derangement of the digestive organs; but they often occur also independently of these sources of irritation, and without any derangement of the general health.

12. ii. *Lichen Agrius — αγριος, Papula agria,* CELSUS: *Lichen ferus,* GOOD. — This species is characterised by acuminated papulæ of a vivid red colour, very numerous, and accompanied with an erythematous redness, which extends to some distance around the margin of the patches. The eruption is attended with a sensation of itching and burning, which is so severe that the patient cannot refrain from scratching: this, however, greatly increases the irritation, and, by tearing off the summits of the papulæ, occasions small ulcers from which a sero-purulent fluid is discharged, forming yellowish crusts which are detached and replaced by others somewhat thinner. The inflammation often subsides, and the scabs are cast off, in about a fortnight; but sometimes the disease assumes a chronic form; the scabs become successively thinner, and terminate in furfuraceous desquamation. This chronic form is often attended with thickening of the skin, which in inveterate cases becomes indurated, rugous and deeply figured. In this state the disease continues for many months, and may even last for years. L. agrius is often attended with gastric derangement, and in its acute form, with febrile symptoms. It may appear as an original affection, or succeed to some of the forms of L. simplex. It is most frequent in spring and summer.

13. There is a form of L. agrius called *Lichen tropicus,* or *prickly heat,* or *summer rash* — the *Sudamina* of various authors; the *Essera* of PLOUCQUET — which is very frequent, and a source of intolerable annoyance in warm climates. It usually appears in the shape of numerous pimples of a vivid red colour, not larger than a pin's head, situated on the chest, neck, arms, and thighs, and sometimes on the forehead. It is accompanied with insufferable pricking, itching, and tingling. The eruption often disappears almost entirely when the patient is cool, but the moment he becomes heated by exercise, or by taking any warm or stimulating liquid, it recurs with as much violence as ever. New comers to a warm climate are more liable to it than long residents or natives. A form of lichen, closely allied to the prickly heat, if not identical with it, is sometimes met with in temperate climates, during hot seasons.

14. II. CAUSES. — Lichen very often occurs without any assignable cause, but it is also frequently attributable to exposure to heat, errors in diet, fatigue, and depressing passions of the mind. L. agrius, in particular, is often occasioned by heat and the abuse of alcoholic liquors. M. RAYER observes that the arms and fore-arms of cooks, founders, smiths, and others, habitually exposed to high temperatures are frequently attacked with lichen simplex or a papular eruption, having the same characters. In children the eruption seems to be often dependent on intestinal irritation.

15. III. DIAGNOSIS. — Lichen may be confounded with various diseases. L. simplex has been mistaken for *prurigo, scabies,* and *eczema. Prurigo* is distinguished by its papulæ being larger, flatter, and more of the natural colour of the skin than those of lichen; the itching in prurigo is also much more severe than in lichen simplex, and of a different character, being of a burning nature, and not accompanied with the tingling sensations of lichen. *Scabies* will be easily distinguished from lichen by its vesicular character, though a few vesicles are sometimes interspersed among the papulæ of lichen. Scabies appears chiefly on the inner surface of the arms and wrists, between the fingers, and on the abdomen, while lichen affects rather the outer and back part of the extremities; lichen also, frequently attacks the face, scabies hardly ever. *Eczema* may be mistaken for lichen simplex, but only through carelessness, it being easily distinguished by its transparent vesicles. *Syphilitic papular eruptions*

cannot be confounded with lichen as they are indolent, free from itching, and have the characteristic copper colour of venereal affections of the skin.

16. *Lichen agrius*, in its chronic form, is very liable to be mistaken for the corresponding form of *eczema*, and where the skin is thickened, as frequently happens in the latter disease, the diagnosis is extremely difficult. On careful inspection, however, a few of the original vesicles of eczema, or papulæ of lichen, may generally be detected, which, with the history of the case, will determine the nature of the disease.

17. IV. Treatment.—Lichen simplex, in its acute form, usually requires but little treatment. A moderately antiphlogistic diet, a saline laxative, avoidance of exposure to heat, and a few tepid baths being all that is necessary. For allaying the itching, lotions with hydrocyanic acid are highly recommended; slightly stimulating lotions are also serviceable. In those few cases where the disease is attended with fever, gastric derangement, &c., a moderate venesection should be practised, and a decidedly antiphlogistic treatment pursued. The infantile forms of lichen, or *strophulus*, require no treatment apart from that of the morbid states which they may accompany, as intestinal irritation, the disturbances caused by dentition, &c. (See art. Dentition.)

18. *Lichen agrius*, in its acute form, even when not attended with fever is benefited by decided antiphlogistic treatment; and a venesection tends greatly to relieve the irritation of the skin. Leeches applied around the most inflamed patches are very serviceable, but care must be taken to place them quite beyond the limits of the erythematous surface. Other local means are seldom of much use; among the best are emollient poultices applied scarcely lukewarm. Tepid baths are beneficial as in the simpler forms of the disease.

19. The *chronic forms* of lichen generally require a tonic treatment. Decoction of bark with sulphuric acid is often very beneficial, and in obstinate cases the arsenical solution may sometimes be used with great advantage. In the advanced stages, when all acute inflammation has subsided, alkaline and sulphureous baths are among the best remedies that can be employed. An ointment containing calomel and camphor, or the protoioduret of mercury, has been recommended by MM. Cazenave and Schedel, to be applied to the diseased surfaces.

20. The *lichen lividus* may be considered as an entirely adynamic affection resulting from distress and starvation, or from a state of general cachexia, and therefore only to be remedied by improved circumstances, change of air, particularly when occurring in the inhabitants of large towns, by nutritious diet, tonics and restoratives, conjoined with alteratives and deobstruents, according to the peculiarities of the case.

Bibliog. and Refer. — *Bontius*, De Med. Indorum. 8vo. cap. 18. — *Clark*, On the Dis. of Seamen, vol. i. p. 34. — *Bisset*, Med. Essays and Observat. 8vo. 1766. — *Hillary*, On Climate and Dis. of Barbadoes. 8vo. — *Cleghorn*, Dis. of Minorca. 8vo. chap. 4. — *Lorry*, Tractat. de Morbis Cutaneis. 4to. 1777 — *M. Poupart*, Traité des Dartres. 8vo. Paris, 1782. — *E. Rigby*, An Essay on Animal Heat and on Cutaneous Eruptions. 8vo. Lond. 1785. — *J. F. Carrere*, Traité de la Douce Amère dans les Dartres. 8vo. Paris, 1789. — *Willan*, On Cutaneous Diseases. 4to. Lond. 1808. — *Underwood*, On the Dis. of Children. 8vo. Edit. of 1827. — *T. Bateman*, Pract. Synopsis of Cut. Diseases. Edit. by *A. T. Thomson*. 8vo. Lond. p. 4. 17. — *S. Plumbe*, Practical Treatise on Dis. of the Skin. 8vo. London, 1824. — *W. C. Dendy*, A Treatise on the Cut. Dis. incident to Children. 8vo. Lond. 1827. — *Cazenave et Schedel*, Abrégé Pratique des Malad. de la Peau. 8vo. Paris, 3d Ed. 1838. — *J. Green*, Pract. Compendium of the Diseases of the Skin, &c. 8vo. Lond. 1835. p. 175. — *P. Rayer*, Theoretical and Pract. Treatise on the Dis. of the Skin, transl. by *R. Willis*. 8vo. Lond. 1835. p. 574. — *R. Willis*, Illustrations of Cutaneous Diseases, &c. folio. Lond. 1839.

LIVER—Its Diseases—Synon.—*Hepar*, ἧπαρ; *Jecur*:—*Foie*, Fr.:—*die Leber*, Germ.: *Fegato*, Ital.

1. The importance of the liver in the animal œconomy has been variously estimated in different times and by different writers. The ancients considered this organ to be the origin of the venous system, and the laboratory in which the red blood is prepared. Some recent physiological writers believe that the liver performs an assimilating as well as a secreting function, whilst others contend that it is restricted to the discharge of this latter function. It is, however, impossible to determine by experiments, in a satisfactory manner, how far an assimilating function is performed by this organ; but there is much reason to infer, that it aids in changing the chyle in the portal and the general circulation into red blood—the extent of aid being however doubtful. Admitting, therefore, its chief function to be that of secretion, an additional question arises, namely, how far this function produces, at the same time, an excreting or depurating effect upon the blood, and on the œconomy in general. A number of years ago (in 1815) I entertained this question, and endeavoured to show, that the combination of those elements of bile existing in the blood in order to form this fluid, necessarily tends to depurate the blood; and that the superabundance of these elements in the blood, and the circumstances conducive to such superabundance, generally give rise to an exuberant secretion of bile, provided that the vital endowment and organization of the liver admit of the discharge of its functions,—but to this topic more attention will be directed in the sequel. Thus viewing the functions of the liver to be, 1st. and chiefly that of *secretion*, 2d. and contingently that of *excretion*, 3d. and concurrently that of *assimilation*: and, having mentioned the nature of the functions performed by this organ, although the exact amount of each, especially of the second and third of these, cannot be ascertained, I proceed to consider — 1st. The chief causes which disturb these functions. 2d. The principal disorders to which these functions are liable; and 3d. The diseases affecting the circulation and structure of the organ.

2. I. Causes of Diseases of the Liver.—In order to prevent unnecessary repetition, whilst considering the several diseases of the liver, I shall take a general view of the causes which usually occasion them. These causes may produce various effects, or associated effects, according to the temperament, constitution, habits, &c. of the individuals subjected to them; and as respects the liver and biliary apparatus in general, the specific effects of these causes will vary with those and with other predisposing circumstances.

3. *A. Age, Temperament, Diathesis, Habit of Body*, &c. — Disease of the liver very seldom

occurs until *after puberty*, unless in the children of Europeans residing in the East Indies or other inter-tropical countries, and when a change to a more temperate climate has not been adopted for them. It is more frequently observed in the sanguine, sanguineo-melancholic, and irritable *temperaments;* in the scrofulous diathesis; and in a plethoric habit of body, than in others. In young or middle-aged persons the diseases which affect the liver are chiefly acute and inflammatory: at advanced periods of life they are most frequently congestive and structural. The infrequency of the affections of the liver until full puberty has been reached is evidently owing to the much less frequent operation of their exciting causes before this period. In warm climates, diseases of the liver are more common in males than in females who are natives of Europe, owing to the greater exposure of the former to the exciting causes; but in temperate climates, and in this country, as far as the returns to the Registrar General of Births, Deaths, &c. show the fact, these diseases are as frequent, or nearly so, in females as in males, especially in large towns.

4. *B. High ranges of atmospheric temperature and the circumstances connected with them* exert a very manifest influence in occasioning diseases of the liver, although various other causes concur with this in producing the effect. It was long since proved by the experiments of CRAWFORD, LAVOISIER, SEQUIN, PROUT, FYFE, and the author, that the quantity of carbonic acid gas formed during respiration in a given time is much diminished in a high temperature, and under circumstances which lower the vital powers. Drs. PROUT and FYFE observed in their experiments that the changes induced in the blood by respiration were diminished during sleep, by the depressing passions, by fatigue, by spirituous liquors, low diet, and by all depressing agents. I found, in 1817, that the changes effected by the air in respiration in a warm, humid, and miasmatous climate were even to a less extent, and furnished much less carbonic acid gas in a given time, than in those experiments which I performed in an artificially increased temperature in a cold climate; and this further diminution of the changes produced upon the air during respiration in a very warm climate I imputed to the presence of malaria, and to the greater humidity of the atmosphere in this latter, than in an artificial high temperature. If therefore less carbon and its combinations be evolved from the blood by respiration in a given time in a warm climate than in a cold one, whilst the quantity of carbonaceous materials conveyed into the circulation is equally great, it must follow, that this substance will soon be greatly in excess, provided that the elimination of it from the blood is not effected by some other organ. Thus one of two states may be expected to supervene during high ranges of atmospheric heat, or upon the migration of Europeans to inter-tropical countries; namely, that owing to diminution of the changes effected by respiration on the blood, this fluid will either possess highly venous characters, and abound in the elements usually eliminated from it during an active state of the respiratory actions; or it will experience changes equivalent to those produced by active respiration owing to the increased actions of other organs; the diminution of the one function being compensated by the vicarious increase of others. Now, when the office of the lungs is insufficiently performed for the state and wants of the œconomy, those very elements which pass out of the blood by this channel accumulate in it, and furnish the materials for increased biliary secretion; the liver, aided by the skin, the kidneys, and the intestines, performing vicariously an increased function, and supplying the deficiency in the function of the lungs, until the œconomy becomes accustomed to the change.

5. In a high emperature also, when the air is saturated by moisture, a much less quantity of aqueous vapour is discharged from the lungs, than in a cold and dry state of the air; and thus the aqueous part of the blood soon becomes excessive, if it be not excreted more freely by some other part of the œconomy. Hence the fluid excretions of the skin, of the mucous surface of the intestines, and of the liver, become so frequently augmented in warm and humid seasons, and in Europeans residing in hot climates.

6. *C. Climate*, and the various physical circumstances constituting climate and *endemic influence*, have great influence in producing the several functional and structural diseases of the liver. Some part of the influence arising from climates is referable to a high range of temperature, to malaria, and other states of the air; and yet it is difficult to account for the greater prevalence of hepatic disorders in one country than in another, when the physical circumstances constituting climate appear to be nearly equal in both. Thus, in Jamaica, these disorders are neither prevalent nor fatal; and yet in parts of the East Indies, where the same range of atmospheric heat and humidity is observed as in this island, and where other physical circumstances, as sources of malaria, &c. seem nearly equal, they are ten times more prevalent than in it.

7. It is difficult to determine the exact influence of great *dryness* or of great *humidity* of the air in the production of hepatic diseases. Probably more may be imputed to a very high range of temperature than to either. The influence of *malaria* in this respect, and of its combinations with humidity of the air, is probably rather indirect than direct and immediate, periodic fevers being the first morbid effect of this cause; and biliary disease a complication or consequence of these. In many places of India where the range of temperature is very high, and at seasons when the air is very dry, primary acute hepatitis is often frequent amongst Europeans; whilst in warm, moist, and miasmatous localities, the hepatic disease is generally consecutive of other maladies. It would appear from the statistical report of the troops in the West Indies, that diseases of the liver are about three times as prevalent among them as among the troops in the United Kingdom, and occasion nearly five times as high a rate of mortality, whilst Mr. ANNESLEY, and other writers on the diseases of the East Indies, estimate the average annual per centage of these diseases in the East to be treble what it is in the West Indies.

8. There are various localities, particularly in the East Indies, where hepatitis appears to be *endemic*, and where the peculiarities of climate, especially in respect of humidity, temperature, and the usually recognised sources of malaria, seem insufficient to account for the circumstance. How far the nature of the water, and other physical agents may

concur with the states of the air in producing this effect, cannot be determined in the present state of our knowledge.

9. *D. Exposure to the sun's rays, to vicissitudes of temperature*, and to various allied causes, certainly aid in producing biliary disorders. The action of the sun's rays on the head, and on the nervous system generally; exposure to the night air and dews, or sleeping in the open air, particularly after having been subjected to the rays of a very hot sun; sleeping on the ground, as in bivouacs and encampments; sudden alterations or transitions of temperature; and sleeping in the sun, occasion not unfrequently the more acute forms of biliary disease, especially in very hot seasons and climates.

10. *E. Diet and Regimen*, next to temperature and climate, are most productive of hepatic disorders. Eating largely or frequently, especially of animal, rich, and highly seasoned food; stimulating the appetite and palate by a variety of incongruous dishes, and sauces, and spices, and wines, particularly in warm countries and seasons, are most influential causes of these disorders. It is probably owing to such full and stimulating diet, that hepatic diseases are more common in the officers than in the troops serving in the West Indies.

11. The use of *spirituous* or other *intoxicating liquors*, especially in excess, is productive of the diseases of this organ — in warm climates, of the more acute; in temperate countries, of the more chronic and structural maladies — although not, perhaps, to the extent generally supposed; especially when active, continued, or fatiguing duties and occupations are performed. It is probable that some liquors are more injurious than others; that brandy and whisky disorder the liver more than gin and rum; that the strong and brandied wines are more hurtful in this respect than the French and Rhenish wines; and that spirits are injurious in proportion to the degree of concentration or strength in which they are used.

12. It is difficult to ascertain what influence, if any, should be imputed to *unwholesome food*, and to *impure water*. The disorder of the biliary organs which may result, probably, will have some relation to the nature of these causes, to the kind of ingesta, and to the impurities existing in the water. It is to be presumed that, when the ingesta, whether consistent or fluid, is of a septic kind, the functions of the liver will be thereby impaired or otherwise disordered; or that congestion of its vessels, or accumulations of bile in its ducts will be thereby promoted.

13. *F.* If *irritating matters*, whether dietetic or medicinal, taken into the stomach, pass into the portal circulation, they may occasion disease of the liver, particularly if they act conjointly with other causes. It is probable that unwholesome or too rich and heating food, and impure water, act in this way; the influx of an unusual quantity of insufficiently elaborated, or stimulating, or otherwise injurious chyle, and of hurtful fluids, into the general and the portal circulation, irritating and inflaming the secreting structure of the organ, and the portal vessels, or occasioning congestion of these vessels and alterations of the biliary secretion.

14. *Mercurial preparations* exert an undoubted influence in producing disease of the liver, either of an inflammatory or of an obstructive character. Dr. Sherwen and Dr. Dick first noticed the occurrence of chronic disease of this organ after mercurial courses prescribed for venereal complaints. The most convincing proofs, however, of this effect of mercurials, are adduced by Dr. Nicholl. Dr. W. Thomson states, that Dr. Chapman of Philadelphia, ascribed the prevalence of hepatic complaints in his neighbourhood to the use of mercury for the cure of autumnal fevers; some old practitioners remarking that, previously to the introduction of the mercurial practice, hepatitis was scarcely known in it. Dr. Nicholl remarks that disease of the liver followed syphilis and chronic ophthalmia in a great proportion of the cases treated by mercury.

15. The *absorption of morbid* or *fæcal matters* from the digestive canal, especially during constipation, may act like other irritating and injurious matters already alluded to (§ 13.). M. M. Cruveilhier, Andral, and Percy believe that these and all other irritating matters, when introduced into the abdominal venous circulation, exert an especial effect upon the secreting structure of the liver, and that they act in this way rather than by the extension of irritation from the duodenum along the common bile-duct to the other ducts and parts of the biliary organs, as supposed by many writers. Dr. Saunders states that the diseased structure may be traced in dram-drinkers along the ducts to the gall-bladder and liver, the ducts being so thickened and contracted as not to admit of the passage of bile.

16. *G. Indolence and sedentary occupations* exert a manifest influence in causing the more insidious, slow, chronic, and obstructive diseases of the liver. It would seem that bodily exercises, especially such exercises and occupations as bring the abdominal and other muscles of the trunk into play, promote the portal circulation and the biliary secretion, and still more remarkably the free discharge of the bile into the duodenum. Inactivity, particularly in connection with full living, favours not only congestion of the liver, but also accumulations of bile in the ducts and gall-bladder, morbid states of this secretion, jaundice, the formation of gall-stones, and structural changes of the organ.

17. *H.* The influence of *mental emotions* on the functions of the liver is generally admitted, and is evinced by the occurrence of jaundice or of inflammations of the organ after violent fits of passion, and of functional and structural diseases of it after the continuance of anxiety and other depressing emotions. The mental depression, which often causes biliary disorder, is in its turn increased by the disorder it occasions, until at last the circulation and structure of the liver are more or less altered. Sorrow, anxiety, and other lowering feelings have an evident effect in weakening the abdominal and portal circulation, and in impairing the functions of the liver to the full extent of function I have imputed to this organ (§ 1.).

18. *I.* The occurrence of abscess in the liver after *injury of the brain*, has been often observed and generally imputed to an intimate sympathy existing between both these organs. But there is every reason to believe that the abscesses formed in the liver in such circumstances have often been consecutive upon inflammation of the veins or sinuses within the cranium. Abscess of the liver is sometimes also consecutive of purulent collections in other situations, or caused by the absorp-

tion of morbid secretions or puriform matters from other quarters, and by injuries of the joints, fractures, surgical operations and other occasions of phlebitis, as shown in the article ABSCESS (§ 24, 27 *et seq.*) However, it is not improbable that severe injuries, as concussions of the brain, sympathetically affect the substance of the liver, and develope acute disease of it. There can be no doubt that the exposure of the body, and more especially of the head, to the rays of a hot sun, is often concerned in producing those insidious forms of hepatitis rapidly passing into abscess, so often observed in India, particularly when aided by intemperance, and by exposure to cold and the night air, or by sleeping without, or with insufficient covering. Injuries of the liver itself, blows on the region of the organ and concussions of it, in falls, &c., are also not infrequently followed by the worst forms of inflammation to which it is liable, particularly in the East.

19. *K. Other diseases* are, perhaps, the most frequent causes of affection of the liver, more especially in warm, humid, and miasmatous climates.—*a.* In these the hepatic malady is generally consecutive of periodic fevers and other ailments; whilst in very hot and dry regions, diseases of the liver are more generally primary and acute among Europeans exposed to the sun. Various dyspeptic symptoms precede the more chronic and insidious affections of the liver; and comparatively few cases of intermittent or remittent fever occur in hot seasons, and more especially in hot climates and in India, without the liver becoming prominently affected, if the fever continue but for a short time. In many cases, also, of continued fever, in these seasons and climates, the liver is prominently affected, and the local disease may continue in a chronic or latent form, after the fever has been subdued; or it may be produced, or developed into an acute state, by exposure either to the sun, or to vicissitudes of temperature, or by intemperance, during convalescence or soon afterwards.

20. *b.* Affections of the liver, particularly obstructions to the discharge of bile, are often consequent upon, or otherwise connected with, duodenitis, or with congestion of the villous coat of the duodenum. In some of these cases the common duct may be obstructed by the swelling of the villous coat at the opening of the duct, and thus give rise to jaundice. Some writers suppose that the affection of the duodenum, or of the stomach and duodenum acts sympathetically on the liver, and interrupts or otherwise disturbs the functions and circulation of this organ so as to manifest this and other related phenomena. According to M. RIBES, ANDRAL, and others, disease may be propagated, not only from the villous surface of the duodenum along the interior of the ducts to the liver, as indeed supposed by Dr. SAUNDERS and others, but also from any portion of the intestinal canal along the veins to the portal ramifications in the liver. In this way some recent writers have attempted to account for the occurrence of hepatitis, or rather of puro-hepatis in connection with dysentery: the puriform collections found in the liver in these cases are supposed to have been consequent either upon the passage of puriform or other morbid matters from the bowels into the portal circulation, whereby irritation or inflammation of the ramifications of the portal vessels had been occasioned, or upon a true phlebitis of the mesenteric veins propagated from the origin of these veins in the ulcerated intestines to the portal vein and its ramifications. This subject however, requires further investigation.

21. *c.* The connection of impaired function, or torpor of the liver, with severe or prolonged dyspepsia is very manifest. They are both adynamic affections generally so intimately connected, that the one is soon followed by the other, that of the stomach being most frequently the primary affection. A similar remark also applies to costiveness and constipation. It was supposed by some writers, that accumulations of fæcal matters in the large bowels may so press upon the duodenum and ducts as to prevent the discharge of bile into the intestines; and that morbid secretions or other matters may so obstruct the opening of the common duct as to produce the same effect. There can be no doubt that, if the causes assigned as productive of the obstruction, were ascertained to be sufficient to occasion it, and if the existence of these causes in such a grade of sufficiency was satisfactorily proved, they should be viewed as efficient agents in the developement of hepatic disorders; but, of themselves, it is probable that they are not sufficient or frequent causes; and that they only concur with other circumstances, and are most influential when the bile itself is inspissated or does not flow readily along the ducts.

22. *d.* Of all diseases, the most intimately connected with hepatic abscess are *dysentery* and *chronic diarrhœa*, particularly in the East Indies. From the accounts given of this association of disease as well as from intimate observation of the cases themselves, it is most difficult to determine which is the primary affection. I believe that either may follow the other; that both may be coëtaneous; and that more frequently the bowel complaint is the consequence of puriform collections silently and insidiously formed in the liver, without giving rise to symptoms so severe as to alarm the patient, and to cause him to relinquish his avocations, or so marked as to enable the physician to determine the nature and seat of the malady. As soon, however, as matter is formed, or collected to an extent calculated to affect the organic sensibility of the organ, particularly in its surfaces, and to awaken the sympathetic sensations of adjoining or related parts; or when the local irritation, or the passage, by absorption of a portion of the contents of the abscess into the circulation, then indications of its existence are manifested — in the first case, by pain, uneasiness, &c.; in the latter, by hectic, chronic diarrhæa, or dysenteric symptoms. The history of many of these cases will show various dyspeptic and slight biliary disorders to have been complained of, weeks, months, or even years before the bowel complaint had occurred; and in some of the cases, where the hepatic affection seemed to follow the removal of the dysenteric attack, it had evidently existed previously to the disorder of the bowels, the removal or suppression of the one rendering the other, which had pre-existed, merely more prominent.

23. *e.* The occurrence of disorders of the liver consecutively upon diseases of the heart and lungs has been acknowledged since the connection was insisted upon by PAISLEY, CORVISART, and POWELL. In these circumstances, particularly

when the heart is diseased, congestion of the hepatic veins, often extending to the portal veins, is the first and chief disorder produced. The frequent connection of fatty degeneration of the liver with pulmonary consumption is remarkable, and will be considered hereafter. Many writers have noticed the co-existence of diseases of the liver and of the brain, and have been at a loss to account for the circumstance. The co-existence is frequent, but not uniform, nor even general. It is sufficiently common, however, to deserve explanation; and is observable both when the mind is deranged and when it is unaffected. When we consider that both the liver and the brain are supplied, as respects their organic actions and functions, only with ganglial nerves; that these organs are hence intimately connected through the medium of this system of nerves; and that the circulation of both is peculiar, and in some degree removed from the circle of the general circulation, and is to a great extent influenced by the ganglial formations supplied to each, we cannot be surprised at observing disorder and organic change often co-existing in both, seeing that their circulation and functions are actuated by the same system, and by the powers exerted by that system; disorder of one part being soon followed by disturbance of other parts intimately related to it.

24. *f.* Suppression of accustomed discharges — of the hæmorrhoids, or of the catamenia, or leucorrhæa, &c.— is sometimes followed by hepatitis. The disappearance, or drying up of eruptions, ulcers, &c., and the closing of sinuses, or fistulas, as fistula in ano, and operations for hæmorrhoids or fistula, have been also sometimes followed by diseases of the liver.

25. Many of the causes above adduced may be insufficient singly to produce well-marked disease of the liver, although each may predispose to it, or even excite it, when acting in an intense form, or without intermission. More frequently two or several of them are combined, or act conjointly or in close succession, in developing the morbid effect: and so various are such combinations and successions of these causes in different persons, circumstances, and localities, that it is impossible to instance even a part of them.

26. *L.* Of the *several races* or *varieties of the human species*, the *white or fair races* are the most prone to diseases of the liver, and more especially to that state of disease which passes insidiously and silently on to abscess. Of these races, the sanguine temperament, the fair complexioned, and the scrofulous diathesis, the last especially, are most liable to this extremely unfavourable form of hepatitis, particularly during very hot seasons, or after emigration to a hot climate. On the other hand, the melancholic and the irritable temperaments, and the sallow and meagre habits of body, are the most liable to experience the slighter or functional disorders, and the more chronic structural lesions, of the liver. Numerous exceptions, however, occur to these general rules. — Owing to the predisposition arising out of temperaments and constitutions, hepatic complaints are often hereditary, or prevalent in the branches of the same family.

27. The immunity of the dark races, particularly of the negro, from diseases of the liver, is very remarkable, even in climates where these diseases may be considered endemic. I have, in other works, ascribed the immunity of these races from these and other maladies to the several points of differences existing between their organisation and that of the white races. The former are constituted to live in a climate injurious to the latter — in warm, humid, and miasmatous regions; whilst the fair races are organised so as to endure without material injury the severities of winter, the changes of the seasons, and the vicissitudes of weather, under which the great mass of the darker races would sink. In the negro — the extreme grade of the dark varieties — the liver is small and performs a more limited range of function, compared with the fair races. The same remark applies to the lungs; for I ascertained by experiments made in a hot climate many years ago, that the lungs of a negro furnish much less carbonic acid gas in a given time than those of an European of the same size, and similarly circumstanced. The skin of the dark races, however, performs a compensating function — one in some respects subsidiary to both respiration and biliary secretion, particularly as regards the depuration of the blood. The brain also in them is better protected by nature from the injurious influence of a vertical sun, than that of the fair races, and is less liable to experience the effects of such influence, either in the more sudden and severe forms of sun-stroke, or in these less appreciable states and affections of innervation, which disorder the hepatic functions more severely than even the cerebro-spinal influence and loco-motive powers.

28. *M. The causes which produce hepatic disease in Europeans in warm climates* have been already noticed; but there are certain combinations of them that may be briefly enumerated. — It is generally overlooked by medical writers, and is certainly neglected by those chiefly concerned, that nature intends the *food* and *clothing* of the inhabitants to be suited to the circumstances of the climate in which they live. The suggestions arising out of our sensations, reflections, and observations, are unheeded in the quick succession and crowding of contending desires, and habits and fashions; and health is sacrificed, and life endangered, to pamper the palate, and to follow the mode rather than adopt what reason approves of, and our feelings suggest. The full, rich, and stimulating animal diet, which might be required, and readily disposed of in cold countries, by persons engaged in active avocations, is no longer suited to the European constitution when removed to a hot climate, and the more injurious does it become the more frequently it is indulged in, and the more it is accompanied with the use of the heating wines and other fermented liquors suited only to northern or temperate regions. The clothing also of those who leave the latter to reside in warm climates is rarely adapted to the novel physical circumstances in which they are placed. The head of the European, which nature has protected sufficiently in his native climate, is dangerously exposed within the tropics, and requires a greater protection than is generally given it. In this particular as well as in several others, foolhardiness is characteristic of many. The common error is a total disregard of those accommodations of clothing to the differences and changes of temperature which often occur with remarkable rapidity in intertropical countries, and are more hurtful in these than in temperate climates.

29. Intemperance of all kinds, but particularly

in eating and drinking; exposure to the sun, and subsequently to the night air, or to cold or wet, especially when the body is perspiring: copious draughts of cold fluids during fatigue, or in a state of perspiration; repletions of the stomach after long fasting; addiction to spirituous liquors; sleeping with insufficient clothing after fatigue and exposure to the sun, particularly either upon or near the ground; disappointments, grief, and the depressing passions generally, and the diseases above mentioned (§ 19. *et seq.*), are the most influential causes of the diseases of the liver in hot countries; and those to which soldiers and sailors in those climates are most exposed.

30. II. OF THE FUNCTIONAL DISORDERS OF THE LIVER. — Under the head of functional disorder may be comprised all those conditions of the biliary secretion which differ from the healthy state, and lead to further disease. These conditions generally are manifested in the quantity and quality of this secretion, and, although connected with changes in the state of the blood circulating in the liver, are not necessarily allied to inflammatory action or structural change; these latter states, however, being also and necessarily attended by alterations from the healthy function of the organ. This latter circumstance — this frequent dependance of disordered function upon alterations of vascular action, or of structure, or of both — requires from the physician the utmost care in determining the state and amount of disease. Even when the disorder of function is ascertained to be independent of these more serious changes, it should be recollected that it often passes into inflammatory states, or even into structural lesions. Indeed, these latter generally proceed from this source, either immediately upon the first functional disorder, or after repeated or prolonged attacks of it. The chief disorders which fall under this head are — 1st. Diminished secretion of bile; — 2d. Increased secretion of bile; — and, 3d. Secretion of morbid or altered bile. To these might be added, accumulations of bile in the gall-bladder and ducts; but as these arise from various circumstances, both functional and organic, and are followed by several changes both in the bile itself and in the parts containing it, this subject is more appropriately considered in the articles GALL-BLADDER AND DUCTS, and CONCRETIONS, BILIARY.

31. The *three* functional disorders of the liver about to be considered have been usually denominated *bilious*, without, however, any precise idea being annexed to the term, which has, even by professional persons, been applied to a deficient secretion of bile equally with an increased secretion. These disorders may be referred to two principal pathological conditions: — 1st. The state of the blood, as furnishing the elements of bile; — and, 2d. The state of organic nervous or vital influence, as actuating both the hepatic circulation and the biliary secretion.

32. I have contended above (§ 4—8.), and in other works, that the blood abounds, more or less, according to modes of living and ranges of temperature, with the materials for biliary secretion. According to such abundance or deficiency, and to changes experienced by the blood during its circulation in the organ, so may it be supposed that the bile will be either abundant, or deficient, or altered.

33. That the vital or nervous influence will act not merely *dynamically* in promoting or impeding the circulation and the secreting function of the liver, but also *qualitatively*, may be admitted, although this latter change may depend more upon the state of the blood than upon the condition of the nervous or vital power. Much will depend, however, upon the states of intimately allied or connected organs, especially in modifying the vital power and functions of the liver. The states of the stomach are often influential in promoting or impeding biliary secretion. When the vital actions of the stomach are energetic, those of the liver are usually co-ordinate with them; and, when these actions are impaired, the functions of the liver equally suffer. Hence the general association of torpor or inactivity of the liver with indigestion; and the frequent supervention of biliary disorders, even of a severer character than these, upon dyspeptic complaints, especially when the latter are neglected and prolonged. Disorders of the duodenum have a similar, and sometimes even a more remarkable, influence on the functions of the liver; and, besides occasioning sympathetic effects, such as those which are produced by the stomach, they sometimes completely interrupt the passage of bile into the intestines, thereby disordering the secreting function, and the secretion itself; and, if the interruption continue, ultimately affecting the circulation and structure of the organ.

34. i. DIMINISHED SECRETION OF BILE. — *Torpor of the Liver — Torpor of the Biliary Organs.*

CLASSIF. — I. CLASS. I. ORDER (*Author*).

35. DEFIN. — *An irregular or costive state of the bowels, the stools being insufficiently coloured with bile; flatulency and various dyspeptic symptoms; a sallow or muddy appearance of the countenance; and lowness of spirits.*

36. *A.* The *circumstances more especially occasioning* impaired action of the liver are, the neglect of exercise; sedentary occupations; indolent indulgences; exposure to cold, humidity, or malaria, after fatigue or excessive perspiration; copious draughts of cold fluids; habitual over-excitement of the stomach and liver, from eating and drinking rich and heating articles, particularly when these are suddenly withdrawn; and a neglected state of the bowels, or accumulations of secretions and fæcal matters in the intestinal canal. When the duodenum and intestinal canal are weakened and when mucous or other secretions accumulate on their villous surface, the ingesta and bile poured into them fail of exciting their healthy action. Hence the emulgent effect usually produced on the ducts from continuity of surface and consent of action is inefficiently performed, if at all; and thus a similar state of function to that existing in the digestive canal is extended to the liver. Habitual inattention to the due evacuation of the bowels thus becomes one of the chief causes of inaction of the biliary organs.

37. *B.* The *symptoms* of impaired action of the liver are not always very manifest; and it is often very difficult, or even impossible, to determine, even when these symptoms are well marked, whether or no they depend merely upon diminished energy, or upon change of the structure of the organ and of its appendages, unless we are acquainted with the patient's habits, and with the nature of his former ailments. When the patient complains — after

having enjoyed good health, or without having experienced on former occasions either acute or chronic affections of the liver or stomach, or other severe disease likely to have implicated the former organ, — of dyspeptic symptoms, with a costive or irregular state of the bowels, the stools being pale or clayey, and the urine dark or high-coloured, or thick, after having cooled, — of want of appetite, drowsiness or pain over the eyebrows, lowness of spirits and hypochondriacal feelings, — of flatulency of the stomach and bowels, a foul and loaded tongue, and a bitter or disagreeable taste of the mouth, particularly in the morning, — and of a dark, sallow, or muddy appearance of the countenance and skin, but without any pain, febrile movement towards night, or thirst, or chills followed by heat or hardness of the pulse, or fullness or tenderness in the region of the liver, — it may be reasonably inferred that the functions of the liver are simply impaired.

38. When, however, the above symptoms occur in a person who has lived intemperately as respecting either eating or drinking, or who has resided long in a warm climate, or who has suffered former attacks of hepatic disorder or protracted periodic fever, it may be inferred that the impaired function is associated with congestion, inflammatory action, or with some organic lesion of the biliary apparatus, more especially if any or all of the symptoms last mentioned be present.

39. When the vital energy of the biliary apparatus is impaired by any of the above causes, or exhausted by drunkenness, dissipation, &c., bile is formed either in diminished quantity or of depraved quality, and sometimes it is both the one and the other. When this state exists, and particularly if it have been of considerable duration, congestion of the portal vessels should always be dreaded, and its existence, as far as may be ascertained, ought to be carefully inquired after. Portal congestion, having supervened upon torpor of the secreting function of the liver, the two morbid states tend to perpetuate and increase each other, by mutual reaction, until enlargement of the organ, or chronic, or even acute, attacks of inflammation of its substance take place, according to the concurrence of exciting causes, and the predisposition arising out of the diathesis or constitution of the patient.

40. Torpor of the liver, then, may arise simply from a depressed or exhausted state of the vital energy of the organ; or from this state associated with accumulations of bile in the gall-bladder and hepatic ducts, or with congestion of the blood-vessels of the organ, or with both; the former disorder gradually inducing, and becoming complicated with, the latter derangements. Impaired secretion of bile is generally associated also with dyspepsia; and it often originates in that disorder, particularly in protracted cases. In many of these instances, the bile is not merely diminished in quantity, but it is also changed in its appearance and properties: it becomes viscid or otherwise vitiated, so as to flow with difficulty along the ducts, thereby causing a loaded state of them, obstruction, and ultimately vascular congestion, biliary concretions, and organic lesions.

41. It is comparatively rare that inaction of the liver is so complete as to amount to an entire suppression or arrest of its functions, unless in pestilential cholera, and in organic lesions of the organ and biliary passages. When the vital action of the liver is so far suppressed as to render it incapable of combining the elements of bile into this fluid, however scanty or morbid, the circulation of these elements or materials in the blood, as shown in the articles Blood (§§ 115—121.), and Disease (§ 97.), becomes most injurious and vitally depressing to the economy. This is fully shown in the pestilential malady just mentioned, and even in other cases and diseases, where the actions of the liver are not entirely suppressed. In many of these latter, (particularly when the inaction approaches and proceeds more gradually than in that malady) other organs, as the kidneys and skin, seem to compensate, in some degree, for the torpor of the liver, and to eliminate from the blood a portion of the injurious materials accumulated in it, owing to this cause. The connection of this subject with the functional disorders of the gall-bladder, more particularly with *inaction of, or accumulation of bile in, the* gall-bladder and ducts, with biliary concretions and with Jaundice, will suggest a reference to these articles.

42. *C. Treatment.*—The means usually resorted to in this and in warm climates, in order to increase the biliary secretion, are mercurials in some form or other, and particularly calomel and blue-pill, given at bed-time, and followed in the morning by a saline or other aperient draught. Various modifications of this treatment have been advised—in some cases large doses of calomel, in others moderate doses of Plummer's or of blue-pill at bed-time, frequently saline purgatives, often a combination of tonic infusions, with the infusion of senna, and with salts. Each of these may answer the purpose, if judiciously employed. It is generally advantageous to combine Plummer's pill with soap; and to give, at the same time, full doses of taraxacum. Different modes of accounting for the action of mercury in these cases have been adduced. Some suppose that the mercury has the effect of stimulating the biliary apparatus; others believe that it acts only in the digestive mucous surface, by removing mucous colluvies from it, and exciting it so as more fully to emulge the biliary ducts. It would seem, from experiments tried on some of the inferior animals, as well as from the well known effects of the preparations of mercury, that they diminish inflammatory irritation of the villous surface of the stomach and duodenum, and carry off mucous matters from the intestinal surface. In this way they may diminish congestion around the orifice of the common duct, remove spasm or irritation of the ducts, and thereby favour a free discharge of bile into the intestines.

43. The next most efficient means of procuring a free secretion of bile, especially after mercurials have been prescribed, are the *bitartrate of potash* with confection of senna and extract of taraxacum; but the potash should be given in large doses, or in smaller doses with the biborate of soda. Instead of exhibiting mercurials in so large or frequent doses, as have been usually prescribed, these medicines, or those about to be mentioned, should be resorted to, and a full or decided dose of a mercurial ought only occasionally to be given; but generally it should be fairly, but cautiously, tried in the first instance. In some cases, Plummer's, or the blue pill may be given every night, for some days, with the purified extract of

aloes and soap, and a saline, or a bitter stomachic aperient in the morning.

44. If these means fail, and if no symptom appears to contra-indicate the practice, an *emetic* may be exhibited, and its operation promoted by diluents or the warm infusion of chamomile flowers, with bitartrate of potash and biborate of soda dissolved in it. Subsequently *blisters* may be applied over the hepatic region; or the *nitro-muriatic acid* may be given internally, and also employed in the form of a lotion over the hypochondriac and epigastric regions. After blistering, I have seen advantage derived from wearing a large plaster over these regions, consisting of the emplastrum picis compositum and emplast. ammoniaci cum hydrargyro. In cases of torpor of the liver unconnected with congestion of the blood vessels, gentle tonics, with alkalies, taraxacum, iodide of potass, or aperients, may prove beneficial; but when the torpor results either from a passive engorgement of the biliary ducts, or from congestion of the portal or hepatic veins, recourse to these might be injurious, by developing chronic or acute inflammation of the organ. Much advantage, however, will be often derived, when the torpor is thus associated, from the continued use of deobstruent aperients, and an occasional recourse to a full dose of calomel, followed by a cathartic draught, with the view of carrying off the bile accumulated in the ducts, and the viscid secretions often adhering, in these cases, to the villous surface of the intestines. In these latter circumstances, the bitartrate of potash and biborate of soda, conjoined with other medicines according to the peculiarities of the cases, are often beneficial.

45. It is sometimes requisite to conjoin with the medicines employed to excite the liver, a substance which may prove a substitute for the bile which is deficient. I have for many years prescribed inspissated ox-gall in this way, usually with the aloes and myrrh pill, or the purified extract of aloes, soap, taraxacum, blue pill, &c.

46. Several of the deobstruent and aperient mineral waters, as the *Cheltenham*, *Beulah*, *Seidchutz*, *Pulna*, or other waters, may be taken in order to excite the action of the liver, and remove obstructions in the ducts. The causes of the disorder should be avoided; and change of air, travelling, and horse-exercise recommended.

47. ii. Excessive Secretion of Bile. — *Increased Biliary Secretion.*

Classif.—II. Class. I. Order. (*Author in preface.*)

48. Defin.— *Copious, fluid, alvine evacuations, highly coloured with bile, often preceded by griping, by nausea, and sometimes by vomiting, or attended by this latter, and acceleration of pulse.*

49. Excessive biliary secretion is more frequently inferred from circumstances than proved by unequivocal evidence. Accumulations of bile may have formed in the gall-bladder and ducts, and when their discharge into the bowels has commenced, they may so excite increased exhalation from the intestinal villous surface, and so deeply tinge the stools, as to give rise to all the phenomena of increased secretion when only an increased discharge of previously obstructed, or accumulated bile has taken place. In this climate, particularly in summer and autumn, these occurrences are common, and are merely minor grades of the same pathological states, which, in a higher degree constitute bilious diarrhœa or bilious cholera (*which see*). Still, in warm climates, and in warm seasons in cold or temperate countries, a more than usually abundant secretion of bile sometimes takes place, without amounting to severe diarrhœa, or to cholera; the stools being fluid, bilious, and copious, and continuing in this state for a considerable time. This occurs more frequently in persons who have recently removed to a hot climate, owing to the cause above assigned (§ 4—8.). It is evident from this, that excessive biliary secretion belongs to the same category with the disorders just mentioned, and that its pathology and treatment involve the same principles as they.

50. Dr. Abercrombie suspects "that the term bilious *stools* is often applied in a very vague manner, to evacuations which merely consist of their fæculent matter mixed with mucus from the intestinal membrane." There can be no doubt of the vague manner in which pathological phenomena are observed by many, even of those who are the most critical, and in appearance the most precise. But no one who has seen bilious evacuations could confound them with those Dr. Abercrombie has mentioned. Those who are conversant with the diseases of hot climates well know that copious and frequent discharges of bile, the stools sometimes containing a large proportion of this fluid, simply from excitement of the organ, caused by the abundance of the biliary elements in the blood, not infrequently take place, and that similar discharges occur during bilious fevers, and when determination of blood to the liver is favoured by circumstances increasing or accelerating the abdominal venous circulation, or by causes irritating the liver itself, and even by the irritation produced by an abscess in a portion of the organ.

51. There is the best reason to suppose, namely, the evidence furnished by observation, that an augmented secretion of bile sometimes follows the more violent mental emotions, and occasionally precedes and even attends certain states of inflammation of the organ. It sometimes also attends or follows those affections and diseases, in which the requisite changes are not effected by respiration on the blood.

52. Respecting the *causes*, *symptoms*, and *treatment* of increased biliary secretion, it is unnecessary to add to what has been already stated, both in the foregoing remarks, and in the articles bilious Diarrhœa, bilious Cholera, and Gall-Bladder.

53. iii. Vitiated Biliary Secretion—*Morbid bile.* — *A.* There is every reason to suppose that the bile is not frequently possessed of morbid appearances or properties at the moment of, or just after, its secretion; but that it acquires these properties after it has passed into the hepatic ducts and gall-bladder, and that, during its remora or accumulation there, such properties are developed, either by the reaction of its elements or components on each other, or by the absorption of its watery or more fluid parts. That, however, the bile is sometimes secreted with remarkably altered appearances and properties, is proved by the pale watery and albuminous state of that which is found in the gall-bladder and ducts of a few cases after death; but these alterations are only met with in connection with chronic structural

change of the organ. That the bile often presents a very dark greenish or greenish brown hue, or is tar-like in consistence and colour, and thicker and more acrid than natural, is indisputable. These characters are often presented even in the evacuations, but more unequivocally in dissections, the gall-bladder and ducts being loaded with bile of this description. Although it probably acquired these characters during its accumulation in these situations, yet it is not impossible that it possessed them in some degree from the first, especially as bile of this kind is often secreted after indications of an unusual accumulation of the elements or materials of biliary secretion in the blood have been manifested.

54. It is unnecessary to adduce proofs of vitiation of the bile whilst it still remains in the system, as this has been proved by chemical analysis, and by the irritating effects sometimes produced by it when applied to several tissues, and even to the skin, although protected by the cuticle. These more vitiated or morbid conditions are, however, observed chiefly in malignant or pestilential maladies; the slighter modifications only of the secretion occurring in the more simple functional and inflammatory states of the organ. It is probable, that, in cases of congestion of the portal and abdominal venous circulation, the bile is secreted with modified characters, and that it then often assumes a darker appearance, and more acrid properties.

55. A *vitiated* state of the bile may attend either a *deficient*, or an *increased* secretion of it. The former association is in a few instances observed in dissections; what has been inferred to exist during life being actually proved by inspection after death. An increased, and at the same time a morbid or vitiated, secretion and discharge of bile is observed upon recovery from pestilential cholera, when, owing to the suppression of the vital actions of the liver, and to the abdominal congestion, the materials of biliary secretion have accumulated in the blood, and the restored function of the organ, acting upon a redundancy of these materials, furnish an increased as well as modified supply of this fluid. A similar state of the bile is sometimes observed after partial asphyxia, and during or after an asthmatic attack, particularly when the functions of the liver are roused by chologogue purgatives. In these cases the obstructed function of the lungs having caused an accumulation of the elements of bile in the blood, the liver, when its energy is restored, combines them into this fluid, which, owing to the redundancy of these elements, is not only increased in quantity, but is also more or less modified in its characters.

56. It is, however, most probable that the bile becomes vitiated in the majority of cases, or chiefly after it has accumulated in the gall-bladder and hepatic ducts; that the acrid properties it there acquires sometimes promote its discharge into the duodenum; that its action upon the intestinal mucous surface greatly increases the secretions and exhalations in this situation; and that its deep tinge is more or less imparted to the fluid stools thus produced, the secretion and discharge of bile thereby appearing greater than it really is.

57. *B. The Treatment* most appropriate to vitiated, morbid, states of the bile, should depend upon the phenomena attending it. If it give rise to diarrhœa, griping, &c. diluents, demulcents, the warm bath, and other means advised in the article DIARRHŒA (§ 27.), small doses of ipecacuanha with alkalies, anodynes, and gentle aperients are often of service. If the irritation proceed so far as to give rise to symptoms approaching to bilious CHOLERA, the means then advised should be employed.

58. iv. NEURALGIC AFFECTION OF THE LIVER. — SYNON. — *Hepatalgia; Dolor Hepatis; Colica Hepatica*, of various Authors. — *Severe Pains of the Liver.* — This affection has been noticed by AVICENNA, ROLFINCK, ZACUTUS LUSITANUS, BARTHOLIN, BIANCHI, and several other writers; and recently by GROSMANN, ANDRAL, and DR. STOKES.

59. It consists of very severe pain in the region of the liver — which is not accounted for by any organic lesion of this viscus or of its excretory ducts that can be discovered during life or after death — of *severe pain, without fever, swelling, or other indication of structural disease of the liver.*

60. It is most frequently observed in the nervous temperament, and in hysterical persons. DR. STOKES states that he has met with it only in females, and that in some of those a decidedly hysterical tendency existed, whilst, in others, this disposition was not indicated. In one case, it seemed connected with what has been called "spinal irritation."

61. *A.* The *principal symptom* of this affection is the pain, which is more or less constant, but subject to occasional and violent exacerbations, in some cases; and, in others, are more intermittent, the state of health being tolerably good during the intervals. The exacerbations, or returns of the pain, are often owing to mental emotions, over-excitement, derangement of the bowels, fatigue, irregularity of the catamenia, or the return of this discharge. The pain, during its exacerbations, is apparently more intense than in acute hepatitis, and is generally attended by tenderness of the hypochondrium and epigastrium. There is sometimes, also, slight jaundice; but generally there is no sign of structural lesion of the organ, except pain. Neither fever, nor swelling, nor thirst, nor biliary obstruction is present: the tongue is not loaded; the urine is not dark, turbid, or scanty; the stools are natural, or not materially disordered; and the functions of the stomach not greatly affected. DR. STOKES remarks that, in several cases, the patients were subject to neuralgic affections in other situations, as the face or extremities: in one severe case, dysmenorrhœa had long existed. I have seen this affection connected with excessive menstruation, and with other disorders of the uterine functions. I have referred it, in more than one case, to excessive bleeding and the use of mercury, and other exhausting or depressing causes.

62. The nature of the pains — their severity, the suddenness of their succession and disappearance, their intermissions, the good state of health in the intervals — all lead to the belief that they are the result of morbid sensibility, manifested in the nervous filaments or plexuses of the liver — of the nerves supplied by the great sympathetic or pneumogastric. Whether or no there may be, in some cases, latent causes of irritation of these nerves, as biliary concretions lodged in the ducts, or in the gall-bladder, although not productive either of biliary obstruction or of vascular disturbance, has not been fully ascertained. M. ANDRAL

states that he has not found them in cases which he has inspected; but in one case, where hepatalgia had been complained of for many years, the gall-bladder contained a number of concretions; and in another, the patient had once experienced an attack which had been recognised as having arisen from the passage of gall-stones into the duodenum. The following is abridged from Dr. STOKES's treatise, as similar instances have occurred in my practice. A lady of luxurious habits and nervous temperament had been attacked, when in India, with pain in the region of the liver, which was imputed to acute hepatitis. She was largely bled and affected with mercury, without relief. On her passage to England, she was bled several times, and twice mercurialized. After her arrival she experienced returns of the violent pain, for which she was also bled, leeched, blistered, and mercurialized. These means had afforded temporary relief; but the complaint returned with increased severity, her constitution became shattered, hysterical paroxysms were frequent and violent, and the stomach irritable. Finding that fever was absent, the right hypochondrium supple, the lower part of the chest sounding clear, the tongue clean, the complexion clear, the above treatment was inhibited, and generous diet, change of air, and full doses of the carbonate of iron, were prescribed. In the course of a few weeks the lady had recovered. Another lady had been treated for hepatitis. A physician was consulted who could not detect any evidence of hepatic disease beside the pain. She was treated by the carbonate of iron with complete success.

63. A lady who had resided in India and experienced hepatic disease, for which she had been bled, mercurialized, &c., on her return to this country consulted an eminent accoucheur, on account of leucorrhœa and uterine disorder. She was hysterical and much weakened; and, in this state, she suffered a severe attack of hepatalgia, which was mistaken for hepatitis and treated accordingly, with marked aggravation of the pain. The disease was viewed as neuralgic upon my visiting her; and a treatment conformable to this view soon restored her to health. Instances, however, are continually occurring of disease — not merely of this kind, but also of various seats and forms — being aggravated, and the constitutional powers injured, by the empirical and routine practice of bleeding, mercurializing, over-dosing, and over-drugging: and although these practices are less remarkable now than twenty or thirty years ago, they are still notorious, and furnish arguments for the knaves of homœopathy, of hydropathy, and of other kinds of humbug, to assail the public mind.

64. B. Of the *Treatment* of hepatalgia it is unnecessary to add any thing to what is stated respecting the removal of *hysteric* and *neuralgic affections*. The same means as are recommended for these disorders are also applicable to this, with such modifications as the varying features and associations of particular cases may suggest.

65. Connected with *Functional Disorders* of the liver, the reader is referred to Bilious DIARRHŒA and CHOLERA; to CONCRETIONS, BILIARY; and GALL-BLADDER and DUCTS.

66. II. CONGESTIONS OF THE LIVER, SANGUINEOUS AND BILIARY.

CLASSIF.—I. CLASS. I. ORDER. (*Author.*)

67. DEFIN. — *Dyspeptic symptoms; costiveness or irregularity of the bowels, the stools being more or less unhealthy; loaded tongue; oppression at the scrobiculus cordis; a pale, sallow, or muddy state of the complexion, and often an increased bulk of the liver, as shown by percussion.*

68. Congestions of the liver are of frequent occurrence, but in various grades and associations. Congestion, as shown by Mr. KIERNAN, may be confined chiefly to the hepatic veins, or it may exist in the portal vessels, or in both. These states of *Sanguineous congestion* may be associated, especially when considerable or prolonged, with *Biliary congestion.*

69. The slighter states of congestion, more particularly partial congestion, are often met with in dissections, particularly when the patient has died from disease attended by difficult circulation through the heart or lungs. These states often can hardly be considered as amounting to actual disease, but are rather consequences of the changes immediately preceding and attending dissolution; but they frequently assume more decided and serious forms; and, although the attendants, or merely the precursors, of several serious maladies, they often present themselves as primary and simple affections. They may be arranged as follows: — 1st, *Partial Sanguineous Congestion of the Liver:* — *a*. Hepatic Venous Congestion, — *b*. Portal Congestion: — 2d, *General Sanguineous Congestion of the Liver:* — 3d, *Biliary Congestion.*

70. *A*. The *First*, or *partial congestion*, may exist in either of the series of vessels concerned in the *double* circulation of the liver. But before I proceed to notice the two varieties of partial congestion, I may premise that the researches of Mr. KIERNAN have shown that the differences which have arisen between MALPIGHI, RUYSCH, FERREIN, AUTENREITH, MECKEL, MAPPES, and others, are owing to the circumstance of these anatomists having examined livers in different states of congestion in respect of the hepatic and portal veins; that the structure of the lobules* is similar, and

---

* The *lobules* are small granular bodies, about the size of millet seeds. Each lobule is *composed* of a plexus of biliary ducts, of a venous plexus, formed by branches of the portal vein, of a branch (intralobular) of an hepatic vein, and of minute arteries; nerves and absorbents, it is presumed, also enter into their formation, but cannot be traced into them. Examined with the microscope, a lobule is apparently composed of numerous minute bodies, of a yellowish colour, and of various forms, connected with each other by vessels. These minute bodies are the *acini* of MALPIGHI. If an uninjected lobule be examined, and contrasted with an injected lobule, it will be found that the acini of MALPIGHI in the former are identical with the injected lobular biliary plexus in the latter, and the blood-vessels in both will be easily distinguished from the ducts. (KIERNAN.)

Thus each lobule *receives* a branch of the portal vein, which ramifies into its margins and a minute artery, the portal vein and artery being *distributed to it;* and *gives origin* to an hepatic duct and an hepatic vein, which vein form a small trunk in its centre, and returns the blood, circulated into the lobule by the portal vein and artery, to the general venous circulation.

The following excellent summary of the anatomy of the liver is given by Mr. ERASMUS WILSON in his admirable work on anatomy. "The liver has been shown to be composed of *lobules;* the lobules (excepting their bases) are invested and connected together, the vessels supported, and the whole organ enclosed, by GLISSON's *capsule;* and they are so arranged that the base of every lobule in the liver is in contact with an hepatic vein (sublobular).

"The *portal vein* distributes its numberless branches through portal canals, which are channelled through every part of the organ; it brings the returning blood the same throughout; that one part of a lobule is actually not more vascular than another; and that there is, therefore, no distinction of red and yellow substances in the liver, the red colour resulting from congestion only, and according as the congestion is in the hepatic or portal veins, appearing in the central or marginal portions of the lobules.

71. As Mr. ERASMUS WILSON has succinctly and clearly stated, each lobule is a perfect gland, of uniform structure, of uniform colour, &c. "It is the seat of a double venous circulation, the vessels of the one (*hepatic*) being situated in the centre of the lobule, and those of the other (*portal*) in the circumference. Now the colour of the lobule, as of the entire liver, depends chiefly upon the proportion of blood contained within these two sets of vessels; and so long as the circulation is natural, the colour will be uniform. But the instant that any cause is developed which shall interfere with the free circulation of either, there will be an immediate diversity in the colour of the lobule.

72. "Thus, if there be any impediment to the free circulation of the venous blood through the heart or lungs, the circulation in the hepatic veins will be retarded, and the sublobular and the intralobular veins will become congested, giving rise to a more or less extensive redness in the centre of each of the lobules, while the marginal or noncongested portion presents a distinct border of a yellowish white, yellow, or green colour, according to the quantity and quality of the bile it may contain. This is '*passive congestion*' of the liver, the usual and natural state of the organ after death; and, as it commences with the hepatic vein, it may be called the first stage of *hepatic-venous* congestion.

73. "But if the causes which produced this state of congestion continue, or be from the beginning of a more active kind, the congestion will extend through the lobular venus plexuses 'into those branches of the portal vein situated in the *interlobular fissures*, but not to those in the *spaces*, which, being larger, and giving origin to those in the fissures, are the last to be congested.' In this second stage the liver has a mottled appearance, the noncongested substance is arranged in isolated, circular, and ramose patches, in the centres of which the spaces and parts of the fissures are seen. This is an extended degree of *hepatic-venous congestion*; it is '*active congestion*' of the liver, and very commonly attends diseases of the heart and lungs.

74. "There is another form of partial venous congestion which commences in the portal vein; this is, therefore, *portal-venous congestion*. It is of very rare occurrence, and Mr. KIERNAN has observed it in children only. In this form the congested substance never assumes the deep red colour which characterises hepatic-venous congestion; the interlobular fissures and spaces, and the marginal portions of the lobules are of a deeper colour than usual; the congested substance is continuous and cortical, the non-congested substance being medullary, and occupying the centres of the lobules. The second stage of hepatic-venous congestion, in which the congested substance appears, but is not cortical, may be easily confounded with portal-venous congestion.

75. "These are instances of *partial congestion*, but there is sometimes *general congestion* of the organ. 'In general congestion the whole liver is of a red colour, but the central portions of the lobules are usually of a deeper hue than the marginal portions.'"

76. The second stage of hepatic venous congestion, when combined with biliary congestion, gives rise to those varied appearances which are called dram-drinker's or nutmeg liver.

77. When the circulation of the liver is impeded in consequence of depressed organic nervous or vital power, or of any other cause, or when the circulation through the capillaries of the lungs is interrupted, or when the general circulation is embarrassed by disease of the orifices or valves of the heart, congestion takes place in the liver. A slight degree of obstacle in the lungs or heart causes congestion of the hepatic veins only, the venous turgescence being limited by the lobular venous plexus. A greater degree of obstruction produces congestion of the lobular venous plexus itself; and if the obstacle continue, or is increased, the congestion extends through the interlobular fissures into the neighbouring lobules, and, in a more advanced degree, it spreads itself throughout the whole of the lobules and becomes general. From the liver the congestion extends to the alimentary canal, occasioning hæmorrhoids, intestinal hæmorrhages, ascites, &c. When sanguineous congestion becomes general, as respects both the portal and the hepatic veins, and especially when it is associated with biliary congestion, the colour of the organ is much deeper, and varies with the colour of the bile in the ducts. The liver at the same time, particularly in hot climates, is more or less swollen, so as to extend, in some cases below the margins of the ribs, but more frequently to rise higher than usual in the right thorax.

---

from the chylopoietic viscera; it collects also the venous blood from the ultimate ramifications of the hepatic artery in the liver itself. It gives off branches in the canals, which are called *vaginal*, and form a venous *vaginal plexus*; these give off *interlobular branches*, and the latter enter the lobules and form *lobular venous plexuses*, from the blood circulating in which the bile is secreted.

"The *bile* in the lobule is received by a network of minute ducts, the *lobular biliary plexus*; it is conveyed from the lobule into the *interlobular ducts*; it is thence poured into the biliary *vaginal plexus* of the portal canals, and thence into the excreting ducts, by which it is carried to the duodenum and gall-bladder, after being mingled in its course with the mucous secretion from the numberless muciparous follicles in the walls of the ducts.

"The *hepatic artery* distributes branches through every portal canal; gives off *vaginal branches*, which form a vaginal hepatic plexus, from which the *interlobular branches* arise, and these latter terminate ultimately in the lobular venous plexuses of the portal vein. The artery ramifies abundantly in the coats of the hepatic ducts, enabling them to provide their mucous secretion; and supplies the vasa vasorum of the portal and hepatic veins, and the nutrient vessels of the entire organ.

"The *hepatic veins* commence in the centre of each lobule by minute radicles, which collect the impure blood from the lobular venous plexus, and convey it into the *intralobular veins*; these open into the *sublobular veins*, and the sublobular veins unite to form the large hepatic trunks by which the blood is conveyed into the vena cava.

"The physiological deduction arising out of this anatomical arrangement is, that the *bile is wholly secreted from venous blood*, and not from a mixed venous and arterial blood, as is believed by Müller; for, although the portal vein receives its blood from two sources, viz. from the chylopoietic viscera and from the capillaries of the hepatic artery, yet the very fact of the blood of the latter vessel having passed through its capillaries into the portal vein, or in extremely small quantity into the capillary network of the lobular venous plexus, is sufficient to establish its venous character."

78. *B. Biliary congestion* is often present, but in various degrees. In the slighter grades it may be the chief lesion, and, in these, it is merely one of function, depending principally upon deficient vital energy of the organ, or upon temporary impediments in the way of the passage of bile along the common or hepatic duct. In its more chronic, general, or severe states, it may be consequent upon hepatic venous congestion, which causes pressure upon the lobular biliary plexus, and interlobular ducts. It may also proceed from temporary or prolonged turgescence or thickening of the mucous lining of the ducts, or from capillary congestion or inflammatory action, diminishing the calibre of the ducts. This obstruction, as Mr. E. WILSON remarks, may subside after a shorter or longer period; or it may become chronic, and be a permanent impediment to the current of bile. Congestion, however, of the bile ducts is probably more frequently caused, when slight or temporary, by causes affecting the states of organic, nervous, or vital influence of the organ, and, when more chronic and severe, by morbid states of the bile itself, rendering it disposed to become viscid and thick, and thus to flow with greater difficulty along the ducts ("Difficili bile tumet jecur." HOR.), and by mechanical obstacles in the large ducts. Of these latter, the most common are the impaction of biliary concretions in the ductus communis, or hepatic duct, inflammation of these ducts, enlargement of the absorbent glands in their vicinity, and the pressure of these or of other tumours, disease of the pancreas, turgescence of the mucous coat of the duodenum, and other changes fully described in the articles GALL-BLADDER and DUCTS, and JAUNDICE.

79. In proportion, generally, as the obstacle is complete, so are the ducts loaded with bile, which imparts a deep yellowish, or yellowish green, or deep green or greenish brown, tint to the organ; much, however, both of the tumefaction and depth of colour depends upon the degree of hepatic, venous, or portal congestion attending the biliary congestion, the hepatic veins being generally loaded in chronic cases of biliary accumulation. When one of the bile-ducts is obstructed by a biliary concretion, the branches above the obstruction become dilated and filled with bile which is thick and viscid, when the obstacle has been of some continuance; but this subject is more fully discussed in the articles just named, and in that on CONCRETIONS, BILIARY.

80. *C. Causes.*—Whatever directly or indirectly depresses the vital energy of the liver, necessarily impairs the tonicity of the veins and favours congestion of them. That the portal veins are more frequently the seat of congestion than is usually supposed, may be inferred from their removal beyond the direct current of the circulation, and from their forming a circulating system of themselves, depending entirely upon their own vitality and that of the liver for the due performance of their circulating function. The circumstance of the portal vessels being found less loaded than the hepatic veins after death, is no proof of the absence of congestion of them during life; for being endowed with certain of the properties of arteries, they also possess in some degree that of contracting or of emptying themselves partially at the moment of dissolution.

81. The ingestion of much food and fluid further promotes congestion of the portal system, inasmuch as a part of these materials find their way directly into the veins which pour their contents into the portal vein; and, although such supply of new materials may not materially affect the robust person who promotes the circulating and secreting functions of the liver by regular and sufficient exercise, yet, when inordinate, it must load the portal and the hepatic veins of the weak, the dyspeptic, the predisposed to disorder of the biliary organs, particularly if they be indolent and doomed to sedentary occupations, and favour a morbid secretion of bile, and accumulations of it in the ducts and gall-bladder. Of the causes of the congestive conditions of the liver, the most influential are high ranges of temperature followed by sudden changes, and exposure to cold or to moisture and malaria; too much animal food; intemperance; want of exercise, particularly in the open air; periodic fevers, and the other causes above adduced (§§ 19. *et seq.*)

82. It ought not to be forgotten that an accurate examination will detect congestions of the liver — *sanguineous* or *biliary*, or both — at the commencement of many diseases, especially of periodic and continued fevers, and of inflammations of the organ. They not infrequently originate, when neglected or improperly treated, other maladies, particularly inflammations, bilious fevers, dysentery, cholera, hæmorrhoids, &c.; and they often attend or follow periodic fevers and diseases of the brain, of the lungs, and of the heart, of the aorta, &c.

83. In *warm climates*, especially in the *East Indies*, congestions of the liver frequently assume very active states, and more prominent features than in temperate climates; and, owing to the general association of biliary with sanguineous congestion, and the great amount of both, it is much more difficult to determine the exact share which each portion of the circulation of the organ bears in the production of the morbid appearances. Generally, however, the viscus is much increased in size, particularly the right lobe, and the increase in bulk often takes place chiefly in the direction of the thoracic cavity, the right lobe rising up into the chest. The difference of colour observed in different cases, and even in the same, seems to depend upon the particular set of vessels chiefly affected, and upon the absence or coexistence of biliary congestion, and the colour of bile in the ducts. The surface of the congested liver is of a dark brown, greenish-black, occasionally passing abruptly into a reddish or light brown tinge. Sometimes it is mottled, or streaked, or clouded with tints of various deepness. The shades of colour are usually most remarkable upon the convex surface, and most frequently observed there. In some cases the surface of the liver is very dark, yet upon dividing its substance, the internal texture is of the usual colour, but more commonly it is darker, and much black fluid blood escapes. The bile found in cases of biliary congestion varies in its characters, but it is commonly darker and thicker than natural, and as described in the article GALL-BLADDER and DUCTS.

84. Passive or mechanical congestion of the liver is not infrequently met with in *infants*, owing to asphyxia upon coming into the air at birth. Those who die in this state present the liver enormously congested.

85. *D.* The *symptoms* of sanguineous and biliary congestions of the liver cannot be individually depended upon. They should be viewed in connection, and duly estimated. We may, however, infer the existence of these disorders when several of the following phenomena present themselves. A pale, sallow, anxious, or muddy hue of the countenance; a white, loaded, or furred tongue; costiveness or irregularity of the bowels, the stools being watery, dark, or otherwise morbid, and preceded by griping, difficult or slow digestion, with flatulence or nausea, and various dyspeptic symptoms; uneasiness, weight, or oppression, particularly after a meal, at the pit of the stomach and region of the liver; oppressed or heaving respiration; the sudden occurrence of pain, fullness or weight at the epigastrium, right hypochondrium, or across the shoulder blades, or below the right scapula, the uneasiness being increased by full inspiration and pressure; a full, slow, oppressed, or irregular pulse; a cool, clammy, dingy state of the skin, a turbid state of the urine; and headache, restlessness, disturbed sleep and unpleasant dreams. Upon examination of the region of the liver by percussion, the sphere of dulness will be found extended, particularly towards the right thoracic cavity. Many of these symptoms, indeed most of them, are observed in inflammations of the organ, but they are then attended by increased frequency and hardness of pulse; by heat of skin and feverishness, particularly at night; by thirst, sometimes with retchings, and by aggravation of the symptoms enumerated. Hence it is as much by the absence of the symptoms characterising the more serious diseases of the liver, as by the absolute value of those mentioned, that we infer the existence of congestions of the organ.

86. The pulse in congestions is variable and cannot often be depended upon. Although a dull or aching pain, weight, or oppression about the epigastrium, or under the scapulæ, characterise in general inflammation of the substance of the liver; yet these are often signs of congestion also — especially when they occur suddenly, and are attended by many of the symptoms already described. Inflammation does not arise or reach its acmé in a few hours, but congestion may. Neither can pain be always considered indicative of inflammation, since the membranes of the liver are often stretched by congestion so as to occasion pain. When *biliary* congestion is at the same time considerable, uneasiness at the epigastrium, a sallow, dingy, or even jaundiced state of the countenance and skin, slowness of pulse, lowness of spirits, inactivity, &c. become prominent symptoms. If an increased secretion of bile follow this state, the congested state of the vessels is relieved, and the circulation rendered more free and natural. But if the congestion continue, inflammation and other consequences already noticed, very often ensue.

87. *E. Treatment.*—When the symptoms of *active sanguineous congestion* of the liver are well marked, and when the patient is strong, young, or plethoric, or is recently arrived in a hot climate, general or local *bloodletting*, according to the peculiarities of the case, is required. The state of the pulse in this affection should not preclude having recourse to this practice, if other circumstances show the propriety of it. In some instances, where a repetition of the bleeding may be necessary, in order to prevent the appearance of inflammatory reaction, which is apt to follow the congestion, particularly in warm climates, when bleeding has been neglected or insufficient, subsequently a full dose of a mercurial medicine, followed by deobstruent and saline aperients, and by enemata if requisite, and a blister applied over the epigastrium and right hypochondrium, will generally remove all disorder. When, however, much *biliary congestion* or accumulation is associated with vascular congestion, a frequent recourse to chologogue purgatives is required. In many of these cases an emetic may be given with advantage, after vascular depletion has been practised where it has been indicated. In the more severe cases, however, of *vascular* congestion, emetics are hazardous unless copious depletion has been resorted to, and the state of the biliary function indicate the propriety of prescribing them. However slight vascular congestion may seem, it should be recollected, particularly by the East Indian practitioner, that it often originates the most dangerous forms of hepatitis, and that abscess may quickly follow inflammation consequent upon the congested state.

88. In the *passive states* of vascular congestion of the liver consequent upon interrupted capillary circulation in the lungs, or upon impeded circulation through the heart or aorta, or associated with adynamic periodic fevers, scurvy, &c., the *treatment* must entirely depend upon the nature and state of the primary affection, and upon its pathological relations. In several of these, particularly when the lungs are congested or inflamed, vascular depletions are necessary; but, in asthmatic, chronic bronchitic, and similar affections, the hepatic congestion thereby caused requires chologogue purgatives, occasionally emetics, and deobstruents. If the hepatic vascular congestion be produced by affections of the heart, bloodletting may be injurious, it ought to be cautiously employed, if employed at all; the chief attention being paid to the regulation and correction of the secretions and excretions, and to the support of the vital powers.

89. III. HÆMORRHAGE OF THE LIVER.—Hæmorrhage into, or from, the liver is very rarely observed. When the blood is effused into some part of the substance of the organ, producing what the French pathologists have termed apoplexy of the liver, the extravasation has been consequent either upon passive congestion of the organ, owing to impeded circulation through the heart, aorta, or lungs, or upon deficient tone of the capillaries of the organ, or softening of the part, the seat of hæmorrhage. In an interesting case, recorded by Sir G. BLANE (*Trans. of Soc. for Imp. Med. Knowledge*, vol. ii. p. 18.), the hæmorrhage seemed to have been consecutive of the latter changes, as it was associated with purpura. It had formed cavities in the substance of the organ; these had burst, owing to return of the extravasation, and effused their contents into the abdominal cavity. M. ANDRAL supposes that hæmorrhage may take place in the structure of the organ in consequence of acute inflammation, but this is not very probable. The extravasation is rarely owing to the rupture of a considerable vessel, but rather to exudation from a number of capillaries, giving rise to several minute collections of fluid or coagulated blood. M. ANDRAL supposes, from specimens furnished him by MM. RULLIER and REYNAUD,

that the fibrine of these collections, when deprived of the red particles, gives origin to certain new productions, encephaloid and others, that are found in the liver; but this requires further proof.

90. Several writers have supposed that hæmorrhage may take place from the liver along the hepatic ducts, the blood passing into the radicles of these ducts, or into their branches or trunks, owing to laceration of the part where the extravasation occurs; but no satisfactory proof of either occurrence has been adduced. The blood, however, may possibly pass into commencement of the hepatic ducts in cases of extreme congestion. This subject deserves, but does not readily admit of, further elucidation.

91. Hæmorrhage from the liver is most frequently *caused* by external injury, and *rupture*, of the organ. When the liver is congested, and at the same time softened—changes occasionally produced in humid and miasmatous situations, either primarily or in connection with adynamic remittent or intermittent fevers—comparatively slight external injuries have ruptured the organ and caused fatal hæmorrhage into the abdomen.

92. Ulceration of one of the hollow viscera may occur, and the inflammation thereby induced in the peritoneal covering may be followed by adhesion to the liver; the ulcer ultimately penetrating into the substance of this organ, eroding one or more of the vessels, and thus producing fatal hæmorrhage into the alimentary canal. I have seen altogether three instances of this kind of hæmorrhage: two where the ulceration commenced in the stomach, extending through the peritoneum, which was firmly adherent to the liver, and terminating in the parenchyma of the latter; and one where it originated in the right flexure of the colon, and proceeded in a similar manner. (See STOMACH, *ulceration of*).

93. In all these cases, the source of hæmorrhage can be determined only by examination after death. Granting the possibility of the passage of the blood from the portal veins into the biliary ducts, and thence from the bowels, the *symptoms* are not such as will indicate it during life, for we have no means of determining whether the blood voided from the bowels proceeeds from the liver or from the small intestines.

III. INFLAMMATION OF THE LIVER. — SYNON. Ἡπατιτις,(from ἧπαρ, the liver) *hepatitis*; νουσος ἧπατκιη, Galen. πυρετος ικτεριωδης, Græc. *Morbus jecinoris, jecoris vomica*, Celsus. *Inflammatio hepatis*, Sennertus. *Hepatitis*, Auct. Mult. *Hepatalgia Apostematosa*, Sauvages. *Cauma Hepatitis*, Young. *Empresma hepatitis*, Good. *Hépatite, Inflammation du foie*, Fr. *Entzündung der leber, leberentzündung, leberkrankheit*, Germ. *Inflammazion di fegato, epatite*, Ital. *Inflammation of the Liver*, *hepatic Inflammation*.

CLASSIF.—1. *Class*, 2. *Order*, (*Cullen*). 3. *Class*, 2. *Order*, (*Good*). III. CLASS, I. ORDER (*Author*, in *Preface*.)

94. DEFIN.—*Pain, aching, tenderness or fulness, in the right hypochondrium or epigastrium, the pain often extending to the right shoulder blade, and other parts; inflammatory fever; furred tongue; frequently cough or bilious vomiting; costive or irregular bowels; scanty, high-coloured urine; a slightly yellow tinge of the face, and sometimes complete jaundice.*

95. Inflammation of the liver frequently originates, silently and insidiously, in some one of the functional disorders already noticed. In warm climates, particularly, it is sometimes preceded by *increased secretion of bile*, marking excitement of the organ, with febrile symptoms, diarrhœa, or slight dysentery, which often attract the chief notice and mislead the physician. In some cases, the *biliary congestion* becomes a cause of irritation to the circulation of the organ, and kindles the inflammatory action it is already prone to undergo; and this is the more to be dreaded, if *vascular congestion* is also present; such congestion being commonly the antecedent of inflammation in some one or other of its forms. It is comparatively rare that hepatitis occurs in a previously sound state of the functions of the organ, unless the exciting causes are energetic, and in warm climates, especially among the new residents. When inflammation thus originates in any of the functional disorders of the liver, it is most difficult to date its commencement; for a slight or early grade of inflammatory action, affecting a part only, as it usually does, of the substance of the organ, may give rise to the symptoms of any one of these disorders, those indicating inflammation being so slight as to escape attention.

96. Inflammation may be *limited* to the following parts of the organ, namely, the superior or convex surface, the inferior or concave surface, the internal or parenchymatous structure, and the right or left lobe. The right lobe is most frequently the seat of inflammation; next the right and left together; and the left lobe only the last in frequency. The inflammatory appearances in the superior surface of the liver are often limited by the broad ligament. When the surface is the seat of the morbid vascular action, the adjoining internal structure of the organ generally participates in it to a greater or less extent; and likewise when it commences in the parenchymatous structure, it sometimes extends to the external surface; but this more rarely occurs, especially in warm climates, than the former mode of extension; the internal structure being the seat of inflammation more frequently than the surfaces, which seldom participate in it, until an advanced stage of the disease. Sometimes, however, inflammation of the surface of the liver may arise from inflammation and the exudation of lymph from an adjoining viscus, as from the stomach or duodenum; and, in these cases, the surface is the chief seat of disease, which may be either limited to it, or extended partially to the substance of the organ. When inflammation originates in the surfaces, or extends to them consecutively, coagulable lymph is generally thrown out on them, and the peritoneal covering is then or has been inflamed; but the parts immediately subjacent may present every mark of inflammatory action, and yet the investing membrane may not participate in it, to the extent at least of throwing out coagulable lymph. In warm climates, particularly in the East Indies, the substance of the liver is often the seat of acute inflammation, or of large abscesses, without any decided mark of inflammation of the envelope of the organ, besides alterations of colour merely, in some cases, which alterations are often independent of the inflammation, or connected with the state of the biliary congestion. Abscesses may even proceed to their utmost extent, and ultimately

break into the abdominal cavity, without having induced inflammation of the serous membrane where they point, without having produced coagulable lymph on its surface, and consequently, without having formed adhesions to adjoining parts.

97. The relations, connections, and integral structure of the organ being so various; the seat of inflammation being often limited to a particular part or tissue; and the character and intensity of the disease also varying greatly; it may be expected that the symptoms will also differ, accordingly, in different cases; that they will be often obscure or equivocal; and that they will be still more so, when hepatitis is *complicated*, as it often is with *gastritis*, or with *duodenitis*, or with *dysentery* or *chronic diarrhœa*.

98. Owing to the varying seat and intensity of hepatitis, the different *forms* of it have been arranged accordingly—into inflammation of the *surface* and of the *substance*—into *acute* and *chronic*. These, and other arrangements, are merely, however, conventional; and although the terms acute and chronic indicate chiefly extreme grades of the disease, the division they mark is, upon the whole, the most practical, keeping in recollection that every intermediate grade of action or intensity may be presented by this disease. Many writers have considered that acute hepatitis commences or is seated in the surface of the organ, whilst the chronic form affects the parenchymatous structure. But although inflammatory action, commencing in the surface of the viscus, almost always assumes an acute form, yet, when seated in the substance of it, the chronic form is not the only one assumed, or if assumed at first, it is not generally preserved. In warm, and even in temperate climates, the most acute inflammation of the liver, as respects many of its symptoms as well as its duration, affects both the substance of the organ and some part of its surface, or the former only. It has likewise been supposed that, as suppuration takes place in the substance of the organ, it is most commonly a consequence of chronic inflammatory disease. But this is not the case, especially in India, and some other warm climates, for abscess often follows with great rapidity the most acute form of the disease, as regards the quickness of its progress.

99. *Investigation* of the diseases of the liver, more especially of those which are inflammatory, should be made patiently and attentively; and an *ocular* as well as a *manual examination of the region of the liver ought always to be made.* Even in cases where the nature of the disease is obvious, this ought not to be neglected. Although such investigation may give us but little information in the functional disorders, or in the early stages of inflammatory diseases of the organ, yet it should be resorted to. Information, even of a negative kind, is always requisite in hepatic affections, and particularly in those which are acute. The trunk of the body should be exposed to view, so as ascertain the existence of bulging or fulness in any part of the hypochondrium or its vicinity. When making manual examination, one hand should be pressed gently on the part between the base of the right shoulder-blade and the spine, whilst, with the other, the physician endeavours to detect tenderness, fulness, or distension, either beneath the false ribs, or at the epigastric region, or to the left of this region, or between the right hypochondrium and umbilicus. The state of the intercostal spaces should also be examined on the right side; and if pain be complained of in any of these situations, its nature ought to be ascertained by careful and varied pressure, whilst counter-pressure is made on the back, in the place just named, and during full inspiration and forced expiration. When the examination is going on, the patient should be directed to bend or move his body in various directions, and to stand, stooping forwards, leaning with his hands on the top of the back of a chair. If fulness, swelling, or distinct tumour be felt, the physician should endeavour to ascertain its nature and connections, by gentle and varied pressure with the points of the fingers; and the existence of tenderness, and the degree of tenderness, the depth at which it seems to be seated, and the presence of fluctuation, whether obscure or palpable, ought to be inquired into with as much dexterity as possible. A rough, rude, or forcible, examination ought to avoided, as causing contraction of the muscles, and as being productive of pain and even of serious injury, in abscess of the organ, or in states of inflammatory congestion of the parenchyma, when more or less softening also often exists.

100. i. *Acute and sub-acute inflammation* may affect either the *parenchymatous structure* or *the surface of the organ;* but it may also implicate both, although either one or the other in a greater degree or extent. — *A.* When *the substance of the organ* is solely or chiefly inflamed, the disease may commence either with chills or rigor, or with diarrhœa, or without either, particularly after exposure to cold, wet, currents of air, the night dew, or to malaria. When chills usher in the attack, then many of the symptoms indicating vascular congestion of the viscus (§ 85.) are usually present, and generally attend the inflammation during its course. The patient complains of oppression, weight, or uneasiness in the right hypochondrium and at the pit of the stomach, extending sometimes to the ensiform cartilage, and in the direction of the diaphragm to the back and shoulder-blades. These are usually increased on a full inspiration, when pressure is made beneath the ribs, or upon the stomach and back at the same time. The pulse is hardly affected at this early period of the disease; but it soon becomes quicker at night. It is sometimes slow and oppressed, and occasionally irregular, or even intermittent. The countenance is now pale, sallow, or somewhat anxious; the spirits much depressed; the tongue white or yellowish, or more or less foul, with an unpleasant taste of the mouth, sickness, and loss of appetite. The bowels are at first often costive or irregular, or diarrhœa may exist, and the urine is scanty and high-coloured. Oppression at the chest and epigastrium; slight dyspnœa, and sighing; headach, and disturbed sleep, with night-fever and restlessness, are also generally present.

101. *a.* As the disease advances, the pulse becomes quicker, fuller, and more irritable, during the evening and night, and is often oppressed or embrraassed during the morning and day. The uneasiness in the region of the liver and epigastrium is augmented; and if vascular fulness of the organ be great, and if the disease has followed congestion, the patient complains of a heavy dragging pain, increased by sudden motion, or

by turning quickly in bed. There is sometimes a short, suppressed cough, dyspnœa, shortness of breathing, a catch in full inspiration, particularly after sudden motion. On examination, tumidity of the viscus is evinced by the protrusion, or dulness on percussion beneath the ribs and scrobiculus cordis, and by the dulness of sound extending higher than usual in the right thorax. A dull pain or aching is often felt in the region of the liver, in the lower part of the thorax, and in the epigastrium, occasionally extending from the right side under the shoulder-blade to the spine. It is sometimes referred to the top of the right shoulder, frequently to the right shoulder-blade, occasionally to both scapulæ, or only to the loins. In a few instances, it is felt in the right clavicle and side of the neck; and, in others, it extends downwards to the right thigh. It more rarely affects the left shoulder and shoulder-blade only. When pain is present in the top of the right shoulder, it indicates disease of the right lobe of the liver; but this symptom is often absent. In some cases it is increased, or excited when not previously felt, upon any sudden concussion of the trunk, or upon quick motion, or making a false step, or turning suddenly from one side to the other. But, in many cases, there is little or no pain: or it is complained of on these latter occasions; or there is merely a sense of aching or dragging, with oppression at the præcordia, anxiety, and frequent sighing. Pain is seldom acute, tensive, or pungent, unless the surfaces or ligaments become affected. It occasionally extends from under the ensiform cartilage, in the direction of the mediastinum, to the back or shoulder-blades, and it is then attended by dyspnœa, oppression or a sudden catch in breathing, and a dry cough.

102. The *position* of the patient varies with the severity and seat of pain. Frequently he is easiest in a semi-recumbent posture. Difficulty of lying on the right side is not often felt, unless the pain in it is acute. In many cases, any position may be preserved for a time without pain, although uneasiness and a change of posture may follow. Occasionally the patient prefers to sit gently bent forward.

103. In proportion to the attendant congestion or tumefaction of the organ, the right cavity of the chest is encroached upon by it, as shown by the extended sphere of dulness on percussion. In this case, there is also greater fulness observed in the right hypochondrium and epigastrium; the margins of the ribs being pushed slightly outwards. Oppressed breathing, frequent dry cough, occasionally acute pain owing to stretching of the envelopes of the organ, and increased discharge of bronchial mucus, are complained of; and these symptoms, with exacerbation of pain in the chest on full inspiration, or on coughing, the flushed or full appearance of the countenance occasioned by the impeded circulation through the lungs, may lead the inexperienced to mistake the disease for pneumonia; but, in these cases, there are pain or uneasiness about the scapulæ, or top of the right shoulder; occasionally numbness of the right arm, with pain about the insertion of the deltoid muscle, or at the wrist; and more rarely, numbness or pain extending to the right hip or thigh; symptoms indicative of the seat of the malady.

104. Nausea and vomiting are often concomitants of the most acute attacks; but, when urgent or continued, there is reason to believe that the concave part of the liver is affected, or that the inflammation extends thence to the stomach, or that it proceeds in the course of the hepatic ducts to the gall-bladder and duodenum. In these cases, the patient complains of a sense of fluttering, weight, or fulness in the right hypochondriac and epigastric regions; sometimes of pain in the abdomen, and reclines chiefly on the left side or back. The stools are generally watery, frequent, scanty and dark coloured, with tenesmus, occasional discharges of blood, and other symptoms of dysentery, for which it is often mistaken. Even when little sickness at stomach is present, there are loss of appetite, and heartburn, or gripes, about an hour or two after a meal, with thirst and lowness of spirits.

105. *b.* As inflammation of the substance of the liver advances, the febrile symptoms, particularly the evening exacerbations, become more marked, and the pulse more irritable. The tongue is covered by a white or yellowish brown fur — moist in the early, but dry in the advanced, stages. Where the disease has followed disorder of the alimentary canal, or repeated attacks of hepatic disorder, the tongue is often smooth and glossy, marked by fissures, and lobulated, particularly in the most severe cases, and in those about to terminate in, or which have already terminated in, abcess. In other cases, especially when congestion, sanguineous or biliary, has passed into inflammation, the papillæ of the tongue are large and distinct, and the surface of it foul and coated.

106. The countenance and skin at the invasion of the disease, or when chills or rigors are present, are pale or sallow. But as the inflammation is developed, the countenance fills out more fully, particularly when there are fulness and oppression in the region of the liver and chest; and a dusky redness appears in the cheeks. The face and eyes, however, still possess a muddy or sallow hue and a dark circle surrounds the eye, particularly beneath it. The patient often complains of pain in the forehead or over the eyes. The skin on the trunk is warmer than natural, especially towards evening, sometimes with a greasy feel, and a scanty or partial perspiration. When the perspiration is more copious it is often offensive. Jaundice frequently occurs in the hepatitis of Europeans, particularly when passing on to abscess, but it seldom takes place in warm climates unless the gall-bladder or ducts are involved, or when hepatitis follows biliary calculi or obstruction of the ducts. The eyes and countenance are always deficient in clearness, and present a slight yellowish or sickly hue.

107. Deficiency of bile in the stools is often observed in connection with hepatitis, but in warm climates it does not often occur; although it is remarked more frequently than a too abundant secretion. When hepatitis is connected with congestion or with accumulations of acrid or morbid bile in the hepatic ducts and gall-bladder, the stools are disordered from the commencement: they are foul, dark-coloured, fœtid, watery, and frequent; or dark green, and offensive; or at first feculent and brown, and afterwards morbid and dysenteric. There is generally tenesmus, owing to the irritation of the morbid secretions, on the mucous surface of the rectum, and this,

with other dysenteric symptoms, often masks the hepatic disease.

108. The urine is scanty, high-coloured, deposits a lateritious or pinky sediment, and scalds the patient in passing it. If the bile be obstructed, a brown, or dark, flaky sediment is often deposited.

109. *c.* The *progress* of inflammation of the substance of the liver is commonly such as now described, both in temperate and in warm climates, until it is resolved by treatment, or has passed into suppuration. But it may present certain *modifications.* It may commence as bilious inflammatory fever, with a full, strong, and frequent pulse, great heat of skin, vomiting, thirst, and various symptoms referrible to the liver and bowels, and indicating predominant affection of them. This form is common in robust, plethoric persons, and particularly those who have recently arrived in a warm climate.

110. In some cases, inflammation affects the substance of the liver and proceeds to suppuration in a more obscure and insidious a manner than that above described. The patient may have complained merely of dyspeptic symptoms, and irregularity or looseness of the bowels, when shivering, followed by heat of skin, and profuse clammy perspirations, ushering in true hectic fever, indicates the supervention of suppuration. In most of these, the case is neglected, or its nature overlooked, until the inflammation either extends to the coverings of the liver, or has given rise to abscess; the symptoms, produced by the one or the other, being those which first attract attention, and disclose the true state of the disease.

111. *d.* The *duration* of acute and sub-acute inflammation of the substance of the liver varies from three or four days to as many months, with the severity of the attack, the intensity of the exciting causes, the habit and temperament of the patient, and the treatment employed; and, as these circumstances may combine, so will the disease be disposed to *terminate in resolution, in abscess, or in some other organic change.*

112. *B. Inflammation of the Surface of the Liver* assumes a more acute and definite character than that of the parenchyma. — *a.* Inflammation of this part, *acute sero-hepatitis,* may occur *primarily* or *consecutively;* in the latter case, the morbid action extends to the surface from an adjoining part of the substance of the organ, or from the peritoneal covering of an adjoining viscus. In this state of the disease, the febrile reaction is prominent, and generally consequent upon chills or rigors. The pulse is much accelerated and hard; pain in the right hypochondrium is more or less acute; and when the upper surface of the right lobe is affected, or when the lobe is much tumified, so that it rises into the chest, considerable tension and pain are felt also in the right thorax, and under the ensiform cartilage and sternum, resembling an attack of pleuritis. Cough, increased pain, or a catch on full inspiration, and tenderness on pressure, especially at the time of a full inspiration, are also present. When the whole of the upper surface of the organ is inflamed, the disease may be mistaken for pneumonia, if the chest be not accurately examined by the stethoscope and percussion; oppression, difficulty of breathing, pain in the course of the diaphragm and under the sternum, being generally considerable. Heat and dryness of the skin, thirst, and the other constitutional symptoms, are more fully developed than in the former variety of hepatitis, and are such as usually accompany acute inflammations of serous membranes.

113. The stools are generally disordered and variable. They are at first scanty, infrequent, and costive; more rarely loose. They are often deficient in bile; but, in warm climates, this is comparatively rare, unless sero-hepatitis has followed torpor or congestion of the organ; more frequently the bile seems unhealthy, and occasionally redundant. At an advanced stage, the bowels are often more relaxed, and the bile is increased. Sometimes diarrhœa, tenesmus, or even dysentery, supervenes in warm climates during the advanced periods of the disease, apparently owing to an increased discharge of morbid bile. The urine is generally high-coloured.

114. *b.* When the *superior surface* of the liver is affected, and there are much tumefaction and congestion of the organ, the symptoms are partly referred to the chest. Coagulable lymph is often thrown out upon this surface, and inflammation is thereby induced in the peritoneal surface of the diaphragm. Hence, symptoms of diaphragmitis often supervene, associated with those of the liver, and with considerable congestion of the lungs. In these cases, the distress and febrile symptoms are very prominent. The patient breathes chiefly by the intercostal muscles, and expresses anxiety at the epigastrium and præcordia, with a sense of tension or stricture across the chest, and an inability to sit or lie otherwise than bent forward. Cough is frequent, hard, and suppressed, with great increase of the pain, inability to take a full inspiration, and occasionally slight mucous expectoration. There are, also, often fulness at the false ribs and epigastrium, shortness of breath, inability of motion or exertion, headach; a full, dusky, and anxious state of countenance.

115. When the outer surface and part of the right lobe is chiefly affected, the pain is most severe in the right hypochondrium, and at the margins of the ribs, sometimes extending to the right scapula and top of the shoulder. A fulness is often perceptible under the margins of the ribs, with tenderness on pressure. The temperature in the region of the liver is sometimes higher than in any other part. The patient most frequently lies on his back, or in a semi-recumbent posture.

116. *c.* When the *concave surface* of the liver is the seat of the disease, and the posterior part or margin is affected, or when the inflammation extends to these situations, the functions of the stomach are then prominently deranged. Nausea and vomiting are often present soon after substances are taken into the stomach. Thirst, anxiety, and pain in the epigastrium, or in the back, are urgent; and sometimes the pain extends to the right shoulder and right side of the neck. The pulse is variable, but generally irritable, quick, small, contracted, or hard. There are often a sense of fluttering at the scrobiculus cordis, a heavy dragging pain in the same situation, anxiety, frequent sighing, and occasionally, at an advanced stage, hiccup, particularly after

cold fluids are taken into the stomach. The patient generally lies on the right side, or on his back.

117. *d.* When the inflammation extends to the gall-bladder or ducts, or to the stomach or duodenum, all the symptoms become more severe. The vomiting is frequent and distressing when the disease implicates the *stomach* or *duodenum;* and burning heat and fulness are felt at the epigastrium, with frequent and painful eructations of flatus, and great tenderness at the epigastrium and right hypochondrium; sunk, anxious countenance, increased heat of the trunk, cold, clammy hands, and quick pulse. If the *ducts* and *gall-bladder* be affected, the pain darts to the right side and back, from the epigastrium; it is also often felt in or near the angle formed by the spine and base of the right scapula. Sometimes it extends from under the ensiform cartilage to the umbilicus, and back to the right hypochondrium. Singultus and acrid eructations are not infrequent in the advanced course of the disease. The patient can seldom bear pressure on the right side and epigastrium, the uneasiness being increased on a full inspiration. In most of the cases of sero-hepatitis, uneasiness or pain is aggravated not only on a full *inspiration*, but also on a forced *expiration;* for this latter mode of ascertaining the seat of pain ought never to be neglected in our investigations of diseases of the liver. Restlessness, want of sleep, a foul, loaded tongue, irregular or disordered bowels, scanty urine, and sometimes jaundice, attend inflammation of the concave surface of the liver; and, if the ducts are implicated, the jaundice is generally complete.

118. *e.* If the *left lobe* is alone inflamed—a very rare occurrence — the more acute symptoms are referred to the left side. If this lobe is affected, the right is generally still more affected, and the local symptoms are correspondent, or are most severe towards the epigastrium. Flatulent distension of the stomach is sometimes urgent, and so great as to push the liver more than is usual to the right side, or to embarrass respiration. In these cases, the stomach often becomes implicated, if the lower surface of the lobe is inflamed.

119. ii. *Chronic inflammation of the liver* may be seated either in the *substance* or in any part of the *surface* of the organ. It may occur primarily, or the acute or sub-acute forms of the disease may have been so far subdued as to subside into a slow, inactive state. — *A.* When chronic hepatitis is *primary*, it is usually seated in the *substance of the organ*, often gives rise to few local symptoms, and occasions very slight constitutional disturbance. But *chronic* is a term conveying no precise idea, and merely signifies a slow state of disease, presenting every grade from that state which may be viewed as only slightly deviating from health. When chronic hepatitis follows the acute, it is usually seated in the substance of the organ; but it may affect the surface, or both. Inflammation may also commence in a chronic form, and, after an indefinite time, be aggravated into the acute state, either by the continued operation of the exciting causes, or by injudicious treatment.

120. As chronic disease of the substance of the liver may present every grade, down from the acute state to the slightest deviation from the healthy function, so the symptoms attending it must vary, and assume more or less precise characters. — *a.* In the *slighter* or more *obscure forms*, the nature of the disease is seldom evinced by distinct phenomena. Various dyspeptic symptoms, flatulency, acid or acrid eructations; sometimes nausea, and less frequently vomiting; loss of flesh; muddy or sallow complexion; dry cough, or embarrassed respiration; torpid state of the bowels; aching or pain in the back, or in the right hypochondrium, or a sense of weight or tenderness in the region of the liver; an irregular state of the bowels, or dark-coloured, offensive, slimy, greenish, or watery or muddy evacuations; dark or saffron colour of the urine; slight acceleration or irritation of the pulse in the evening; increased heat and restlessness in the night; heat of the palms of the hands and soles of the feet in the evening, and chilliness in the morning; white, foul, or rough tongue; bitter taste of the mouth; sickly or yellowish hue of the countenance; depression of spirits, and, in some cases, elevation of the shoulders, are the chief symptoms of this variety of hepatitis; but some of them may be absent, and others may be very slight or evanescent, or slightly manifest.

121. *b.* In the *severer states* of the chronic disease, the symptoms are often nearly the same as those attending the sub-acute form, only differ in degree, and more distinctly mark the organ and part affected; but, in the slighter cases, they are less precise, more equivocal, and less to be depended upon in forming a diagnosis. They may even preserve this character until the inflammation passes into suppuration, or a large abscess forms, when similar phenomena to those which indicate it in the more acute disease, begin to appear. Chronic hepatis, in any of its grades and states, is often *associated* with slight or chronic inflammatory *initation* of the *gastro-intestinal villous surface*, and hence several of the symptoms of both affections are associated in many cases.

122. *B. If the surfaces of the liver* become involved in this disease, the symptoms are then more distinct and acute.—*Chronic sero-hepatitis.* Pain or aching is more defined and marked; and as the superior, or the inferior surface is chiefly affected, so is it referred to the chest in the one case, or to the stomach and bowels in the other. When the superior and exterior part of the right lobe is affected, the patient then lies with most ease on the right side, and often feels at an advanced stage of the disease, more or less acute pain, or a dragging sensation, upon turning to the left. If this latter occur, the existence of adhesions between the liver and right side may be inferred. He therefore prefers the semicumbent position, or lies on his back or right side.

123. *C.* In many cases of chronic hepatitis, the disease affects both the *substance* and the *surface* of the organ, although either may be more especially implicated. In these, the symptoms are variously manifested. There is generally much loss of flesh, and frequently enlargement of the viscus may be detected. Tumefaction or enlargement may arise from three conditions: — 1st. from congestion, sanguineous or biliary, or both: — 2d, From the more chronic deposition of lymph between the lobules, or from other lesions of structure; and 3d, From suppuration and the formation of an abscess, or abscesses in the substance of the

organ. The *first* of these generally soon subsides after depletion and an active recourse to chologue purgatives; the *second* is more obstinate, is persistent, and attended by symptoms about to be noticed; and the *third* gives rise to a regular hectic remittent, and other phenomena, local and constitutional, which will be considered in the sequel.

124. iii. *Terminations or Consequences of Hepatitis.* — *A.* The *acute* and *sub-acute states* of the disease: — 1st. Terminate in resolution with a more or less gradual subsidence of the morbid phenomena: — 2d. They pass into the chronic state, and the various organic lesions connected with it: — 3d. They give rise to suppuration and its several states and consequences: — 4th. They may occasion exudations of lymph on some portion of the surface of the organ, and extension of the disease to adjoining viscera or parts, and 5th. and most rarely, The most acute state may produce gangrenous softening. The other changes observed, in consequence of acute hepatitis, are rather parts of the morbid process, especially in its progress to suppuration, as red and greyish softening of the structure, infiltration of the serum or of lymph, &c., as will more fully appear hereafter.

125. In the course of the disease and particularly of the more unfavourable cases, various *complications* arise, and favour a fatal issue. When suppuration takes place, such complications more readily and generally take place, and sometimes destroy the patient, or aid the hepatic malady in producing this result, even before the abscess has opened into any other viscus. Some of these complications may arise independently of continuity of surface, or anatomical connection or proximity, and entirely from the passage of morbid matter into the circulation, or over continuous surfaces, or from constitutional irritation, affecting parts predisposed to disease.

126. *B.* As in the more acute forms of the disease, so in the *chronic states,* several of the changes usually mentioned as terminations of hepatitis should be rather viewed as advanced stages of the inflammatory state, and others as the usual consequences of this state in certain constitutions or diatheses, since the morbid vascular action still continues, although somewhat modified in character or activity. Chronic hepatis: — 1st. May terminate in resolution, and a return of the healthy functions: — 2d. It may pass into the acute or sub-acute states, and the several resulting structural changes: — 3rd. It may give rise to suppuration and abscesses: — 4th. It may occasion enlargement and other organic lesions: — 5th. It may implicate the ducts and gall-bladder, and occasion various changes of them, of the bile, &c. with jaundice: — and 6th. It may give rise to various complications or serious maladies of adjoining or related organs, owing either to exudations of lymph on the surface of the organ, to the extension of inflammatory initation along continuous parts, to the irritation of morbid secretions on the intestinal villous surface, and to the absorption of such secretions into the blood. The most important of the above terminations and consequences of acute and chronic hepatitis, require a more particular notice.

127. *A. Resolution* is indicated by subsidence of pain, uneasiness, and fever; by the tongue becoming cleaner, the urine paler and more copious; and the stools more natural: and by the subsidence of the thoracic, or the gastric symptoms, according as either may have been present. Tumefaction of the organ also rapidly subsides, as shown by the extended clearness of sound on percussion, in the lower part of the chest; and by the diminished fulness and tension of the right hypochondrium and epigastrium. The existence of swelling is one of the chief indications of the persistence of the disease, in a less acute form, if the other symptoms are ameliorated, or of the supervention of suppuration.

128. *B. Abscess* is one of the most frequent and dangerous consequences of hepatitis, particularly in warm climates: and occurs chiefly in those insidious states of the disease which are not attended by acute symptoms, although often rapid in their progress. It may follow any grade of inflammatory action — the acute, subacute, and chronic; and it may occur with any rate of rapidity; but it is most frequent, and the most to be dreaded, in the sub-acute inflammation of the substance of the organ, attended with tumefaction and with much disorder of the bowels. It is especially favoured by the *scrofulous diathesis,* and sanguine temperament; and is with difficulty prevented when there is difficulty in determining whether affection of the liver, or dysentery is the primary disease, or, when if the former does not occasion the latter, it is a concomitant or a consequence of it, — when hepatitis is marked, at an early stage, with much swelling, oppression, or a dull aching, and much irritability of pulse towards evening, — when swelling, or fulness of the hepatic region continues, and more especially if it increase after the more acute symptoms are partially subdued, — and when the patient is exposed to hurtful influences during the treatment, or at an early period of convalescence, or indulges in stimulants, or too much food during this period, or before the healthy functions of the stomach and bowels are restored. In these circumstances, and in debilitated persons of a scrofulous diathesis and sanguine temperament — in the fair-haired and complexioned, the blue-eyed, the relaxed and enervated, those subject to bowel complaints and the sedentary, abscess often forms suddenly and unexpectedly, no very prominent symptom preceding or marking its occurrence. In these persons there is often little or no sign of existing inflammation, or the symptoms are ill-defined, by no means acute and equivocal, presenting more of a passive than of an active character, although the course of the disease is frequently rapid. In those, even when suppuration takes place, there is often no definite indication of its occurrence, although the physician may be aware of the existence of hepatitis. In these circumstances, patients often neglect themselves, until abscess has actually formed, and some consecutive disease, as dysentery and chronic diarrhæa, may have made its appearance, which may mark the primary malady, and engage the chief attention of both patient and physician.

129. On the other hand, the inflammation preceding abscess is often active, acute, and attended by evident local symptoms and inflammatory symptomatic fever, in strong, plethoric, and unimpaired constitutions. When the attack is very acute in these, particularly if the scrofulous diathesis is present, and if the organ be congested

and tumefied, abscess rapidly forms if the disease be not actively and promptly treated; and it is generally preceded and attended by symptoms, enabling the physician to prevent and to ascertain its occurrence. It is often owing to the diathesis, to previous disorder, or to some fault in the state of the organ, that abscess appears in these more acute and well-defined cases, when early and judiciously treated.

130. The pre-existence of *congestion*, sanguineous or biliary, or both, favours greatly the occurrence of suppuration as a consequence of inflammation of the liver. The previous congestion also increases the swelling generally consequent upon inflammation of the substance of the organ. When the swelling, or the signs indicative of it, attend the commencement of hepatitis, coincident congestion may be inferred; and, when they follow the disease, or appear at an advanced stage, they indicate the effusion or infiltration of lymph in the interstices between the small lobules, and denote a similar state of parts to that accompanying inflammation of more superficial and tangible glands, often, however, in connection with vascular and biliary congestion. When suppuration commences, and as it proceeds, tumefaction of the liver, fulness of the hepatic region, the sphere of dulness on percussion in the infra-mammary region of the right thorax, oppression, weight, and aching at the epigastrium and hypochondrium, are generally increased. When the increase of bulk, owing to incipient suppuration, is chiefly in the lower or concave part of the organ, it is less evident upon examination than when it is seated in the superior and outer portion.

131. *a*. When *suppuration* occurs the pulse becomes quicker and softer, or more irritable, and shiverings are often observed, either with or without perspirations. The countenance becomes pale, or sallow, or more sunk; the oppression, uneasiness, or weight in the hepatic region increases; and the perspiration sour or otherwise offensive. As suppuration proceeds the hectic fever attending it is more distinctly marked, and is never wanting. The other symptoms vary with the constitution and previous health of the patient, with the part of the organ diseased, and with various other circumstances. But when a large abscess is formed in the liver, or when it is seated towards the upper and outer portion of the right lobe, the following phenomena are usually observed: — 1st. Tumefaction of the organ, without any sign of fluctuation, but with a doughy, œdematous, or boggy feel of the hepatic region, or in some part of it:—2d. Distinct swelling or tumours below the margins of the ribs, or at or near the epigastrium:—3d. Bulging of the false ribs with increased fulness of the intercostal spaces:—and 4th. Fluctuation becoming more or less manifest in such tumours.

132. In some cases, the pain in the right side has been confined to a particular spot, which has corresponded with the situation of the abscess; and frequently increased heat has been felt in the part more especially tumefied. In a few instances the enlargement has been found low in the right hypochondrium, or even extending to the left hypochondrium, across the epigastrium. However, these local symptoms, if no fluctuation or doughiness be felt, and if the constitutional signs of suppuration be not present, may indicate only that state of parts about to pass into abscess, and may exist for some time before the local and general signs of this change present themselves.

133. *b*. The *constitutional symptoms* of abscess of the liver are often as equivocal as the local signs. In persons whose constitutions are broken down, in the phlegmatic and the scrofulous, the nature of the disease may altogether escape detection, until disclosed by *post mortem* inspection, more particularly when suppuration has followed chronic inflammation, and has been attended by dysentery or chronic diarrhœa. Rigors are not always complained of, but slight shudderings and formications are often substituted. When, however, they occur and are followed by copious night perspirations, after states of disorder above described, there being no reason to infer the existence of ague, they indicate the formation of matter in the organ. In some instances an internal sense of throbbing and fluttering in the region of the liver, followed by a soft pulse and night perspirations, with clamminess of the extremities, indicate this change, particularly when viewed in connection with the previous disorder and concomitant phenomena. In the advanced progress of abscess, cold sweats and faintness, or leipothymia, often occur, with anxiety and oppression at the præcordia. If these symptoms appear in a person whose system has not been affected with mercury, given with this object, we may the more certainly infer the existence of abscess. The impossibility of affecting the mouth by mercury when suppuration has commenced, is acknowledged by all experienced writers on the disease.

134. In connection with the hectic produced by abscess, the state of the tongue varies; but it becomes at last brown, red, smooth, lobulated, &c., or dry and parched. The stools are always disordered, and present in different cases, and at different periods in the same case, every possible appearance, with straining, tenesmus, discharges of blood from the bowels, and frequent calls to evacuation, particularly at night. When disease of the bowels becomes *complicated* with abscess, both the small and large intestines are affected; at first functionally and afterwards organically; and the patient is often carried off by the bowel disease, before the abscess has made its way either externally or into any other viscus. In some cases of hepatitis, in warm climates, associated with dysentery, especially of chronic hepatitis, the termination in abscess is either accelerated or caused by the sudden arrest of the dysenteric affection; or the hepatic malady becomes more severe and apparent as the affection of the bowels subsides.

135. In an advanced stage of abscess, especially when seated in the posterior parts of the liver, and pressing upon the diaphragm, anxiety and oppression at the præcordia become urgent, with attacks of dyspnœa and hiccup. The position preferred by the patient depends upon the seat and direction of the abscess. He most frequently reclines on the back, or on the left side, or in a semi-recumbent posture; and he sometimes has most ease when sitting and leaning forwards. Pain is a very uncertain symptom. During the tumefaction of the organ preceding the formation of matter, pain is often considerable,

and is afterwards converted into a beating or throbbing sensation, sometimes attended by shooting or darting pains in various directions, or merely by prickings chiefly in the situation of the abscess. In the more chronic cases, these latter sensations may be the only painful feelings complained of, unless occasionally on sudden motion, on sneezing, coughing, &c. The countenance generally becomes sunk, sallow, or jaundiced; and when jaundice does not appear, the eyes are generally either yellowish, or of a pearly hue. Emaciation increases, and is most apparent in the extremities, the upper regions of the abdomen appearing fuller than usual. The urine sometimes becomes turbid, and in rarer instances puriform or muco-puriform.

136. Suppuration of the liver, however, has occurred where the symptoms of hepatitis have not been observed, and where the abscess which has formed has not been suspected during life — pain, tumour of the hepatic region, jaundice, &c. not having been present. Instances of this kind have been recorded by many writers in this country, and by most of those who have treated of inter-tropical maladies. In many cases, the disease has not been recognised in consequence of the imperfect examination of the case; in others, from the complications or forms in which it has occurred. Its association with gastro-enteritis, with pneumonia, or with dysentery; or its appearing consequently upon continued or remittent bilious fever, or after ague, will sometimes entirely mask it from the superficial or careless observer. There is much truth in the remark of Mr. TWINING, that he has never seen a case terminate in abscess without being able to detect the disease that is in progress by a careful examination before suppuration commences; but then, as Mr. MARTIN justly adds, the examination must be most rigorous, and repeated daily until we are quite satisfied as to the nature of the case.

137. Abscess may have formed in the liver, and *death* ensue before it makes its way beyond its seat. This result is owing: — 1st. To the constitutional irritation produced by it:—2d. To the absorption into the circulation of a portion of the puriform matter as it is formed:—3d. To the consecutive disease thereby occasioned in other organs. The hectic fever attending abscess is probably caused by the passage of the morbid matter into the blood, and the bowel disorder, which so frequently attends it, may be the result of this circumstance. There can be no doubt, however, that the disease of the bowels is sometimes so severe, and the organic lesions found in them so extensive, as to fully account for the death of the patient before the abscess had opened into any part. Consecutive disease in the lungs and in the brain may likewise be occasioned before abscess has made its way from the liver, and prove the more immediate cause of death. Pneumonia and coma are not rare in such cases.

138. When abscess makes its way beyond its seat, or through the coverings of the liver, the direction it takes much depends upon the part of the organ in which it is seated. If, in consequence of the absence of inflammation from that part of the surface or coverings of the liver, the seat of abscess, or of the inflammation not being productive of coagulable lymph, no adhesions are formed between the external surface of the abscess and the part opposite to it, the matter will be necessarily effused into the peritoneal cavity, where it will produce peritonitis. But if adhesions form through the medium of coagulable lymph with the parts opposite, the abscess will proceed accordingly and open into an adjoining viscus. Hence, abscess of the liver terminates as follows: — 1st. and most frequently *in death* — (*a*) owing to its effects on the constitution and to the complications induced without having opened or passed from the organs — (*b*) in consequence of having opened into adjoining parts, and of the additional disease thereby induced, as well as of the persistence or increase of the lesion of the liver; 2d. and more rarely *in recovery*—(*a*) in very rare instances, without opening of the abscess into adjoining parts, the matter having been absorbed and eliminated by the kidney — (*b*) after it has opened in certain situations.

139. The situations in which the abscess opens are: — 1st. Without having formed adhesions into the peritoneal cavity:—2d. Having formed adhesions externally through the abdominal parietes:—3d. Through the diaphragm into—(*a*) the pleural cavity — (*b*) the lungs and bronchi — (*c*) the pericardium:—4th. Into the stomach:—5th. Into the gall-bladder or ducts, passing thence into the duodenum:—6th. Into the colon, duodenum, or some portion of the small intestines, particularly the former:—7th. Most rarely into the right kidney, or into the vena cava. Certain of these terminations may be recognised during life, and recovery may take place in a few instances.

140. *a*. The *external opening* of an abscess of the liver is preceded by much swelling in the hypochondrium and epigastrium, and often by increased heat. As the matter makes its way to the surface, the swelling becomes less diffused, assumes more the form of a distinct tumour, and appears obscurely acuminated or concentrated, with a very deep-seated base, the integuments over its apex becoming discoloured and inflamed; and it becomes softer and more fluctuating in this situation, whilst it continues hard towards the base. The softness and the discolouration which takes place in the integuments over the apex or centre of the tumour, are the only indications which can be relied upon of the abscess having formed an adhesion to the external parietes of the abdomen, and are the only circumstances in which an operation should be resorted to; if they are absent, it ought not to be attempted. Owing to the neglect of these indications I have seen great mischief result from having recourse to an external opening; and I have further seen the tumour caused by a distended gall-bladder mistaken for an abscess, and an operation on the point of being performed. Owing to pressure on the common duct, or to permanent closure of it, the accumulation of bile in the gall-bladder may produce so great distension of it as to simulate abscess of the liver so closely as to be distinguished from it with great difficulty. The distension of the gall-bladder may even be associated with or caused by abscess, in which case the diagnosis becomes still more difficult, as all the antecedent and concomitant symptoms of the latter are observed. But attention to the indications just named will guide the physician aright. The *diagnosis* is very fully stated in the article GALL-BLADDER (§ 22.). The abscess may make its way externally, not only at the margins of or be-

low the ribs, but also by a fistulous opening between the ribs, or beneath the axilla, or in the back.

141. *β*. The passage of matter from an abscess in the liver *through the diaphragm* into either the *pleural cavity* or into *the lungs*, is not infrequent. In these cases the peritoneal surface of the diaphragm adheres to the part of the covering of the liver external to the abscess, and generally a similar adhesion of the opposite surfaces of the pleura also takes place, and the matter passes into the bronchi. In this case the patient sometimes recovers; but, in the comparatively rare instances of the effusion of the matter into the pleura, fatal pleuritis results. When the matter is about to make its way into the lungs, many of the symptoms of *diaphragmitis* and of *pleuritis* of the diaphragm are present, with severe dry cough, pain, constriction, and oppression at the base of the thorax, hectic fever, hiccup, anxiety, dyspnœa, rarely jaundice, the semi-recumbent or sitting posture, and absence of the auscultatory signs of pneumonia; and, as soon as the abscess bursts into the bronchi, the patient experiences a sudden feeling of suffocation, followed by a copious expectoration of puriform matter, attended by diminution of the swelling, fulness or tumour in the hepatic region; the lung (commonly the right) into which the abscess had burst having lost its respiratory murmur, and become dull on percussion. Generally as the matter is evacuated the lung recovers, or partly recovers, its permeability, the bronchi emptying themselves in the course of two or three days. The passage, however, of matter into them induces more or less bronchitis, which often continues, even in the most favourable cases, for a considerable time. The matter expectorated in such cases is usually well-formed pus, but it sometimes is mixed with some blood.

142. *γ*. When abscess points upon the *stomach* or *duodenum*, there are generally much diffused swelling and hardness at the right hypochondrium and epigastrium, frequently jaundice, urgent and distressing vomiting, especially soon after substances are taken into the stomach, occasionally attacks of dyspnœa, difficulty of swallowing, flatulent eructations, and singultus. After an exacerbation of these symptoms, with clammy perspirations, coldness of the extremities, &c., the patient throws up a quantity of purulent matter, sometimes mixed with a little blood, and the hepatic swelling subsides.—When the abscess opens into an *intestine*, diarrhœa suddenly appears, the stools consisting chiefly of purulent matter. When there is only a single abscess of the liver, and the organ is not otherwise diseased, and the malady no further complicated, the opening into the alimentary canal may close and the patient ultimately recover; but more frequently a fistulous opening remains, and matter continues to be discharged from time to time until the patient sinks.

143. *δ*. Of the opening of the abscess into the peritoneal sac, or into the pleural cavity, or in any other situation, it is unnecessary to offer any remark. Of these, rupture into the abdomen is the most frequent. When this occurs, the consequent peritonitis is most acute. Cases have occurred of rupture of the abscess both into the digestive canal and into the peritoneal cavity. A case of this kind is recorded by Dr. STOKES; and one has been adduced by Dr. GRAVES, where the abscess opened into the stomach by three perforations, and also into the pericardium. Cases have also been recorded of an abscess making its way both into the lungs and into the bowels; and others have occurred when it has been opened externally and afterwards burst into the digestive canal or some other situation. In these cases there have probably been more than one abscess.

144. C. *Chronic enlargement of the Liver* is a frequent consequence of inflammatory states, particularly of repeated attacks of chronic inflammation, and even of the several states of congestion and of functional disorder, complicated with or consequent upon remittent and intermittent fevers. The liver is generally enlarged in a gradual manner, but also so perceptibly as hardly to be mistaken. Its function is much impaired, the bile being scanty and depraved. The urine is also much disordered. A frequent, hacking, dry cough, a sallow pasty complexion, dyspepsia in various forms, emaciation, general ill health, and cachexia, with lowness of spirits and despondency, are usually present. A careful examination of the hepatic region, and due consideration of the history of the case, will enable the physician to *distinguish* this *state of disease from chronic pleurisy with effusion*, with which some writers believe that it may be confounded.

145. The *diagnosis* insisted upon by Dr. STOKES as marking the differences between these two diseases may be here noticed:—in both, the physician will find extensive dulness of the side on percussion, absence of respiration, and the other stethoscopic signs nearly the same, with a full or dilated side and decubitus upon it. The swelling in the hepatic region may be the same, that arising from displacement nearly equalling that caused by enlargement of the organ. But, when the side is dilated by a fluid, the intercostal spaces are raised either to a level with the ribs or even protruded beyond them, and the side has a smooth and rounded appearance. "On the other hand, when the dilatation is caused by a solid tumour, the reverse of this occurs: the pressure being made upon the ribs, these are pushed outwards, but the intercostal spaces preserve their relative positions with them, and the side does not present any thing of the smooth and rounded appearance described." Dr. STOKES, however, places more reliance upon this distinction than it deserves—and it altogether forms a piece of nice speculative diagnosis, which will not be generally realised in practice; for, as I have observed for many years, however firm or unyielding the enlarged liver may be, it is rarely such if the enlargement be considerable, as not to be indented by the pressure of the ribs, and thus to protrude the intercostal spaces as much as fluid effusion. Attention to the extent and sphere of dulness on percussion, in different positions, to the history of the case, and to the *toute ensemble* of phenomena, will be a surer guide to the thinking observer than dependence upon single points, however nicely distinguished.

146. There is often greater difficulty in distinguishing the chronic enlargement of the liver now under consideration from that attending or preceding abscess; and the importance of the diagnosis is sometimes great. In both instances there is enlargement; therefore, as to this, no distinctions can be offered. The questions are, 1st. Is an abscess formed? and if this be answered in the negative; 2d. Is there one about to form? The

answer to the *first* question can be made only from the evidence of abscess above furnished (§ 131. *et seq.*), or from the want of such evidence. The answer to the *second* question is furnished by the symptoms of inflammation preceding suppuration, by the symptomatic fever, with the other phenomena attending it; and by the general and local symptoms of chronic enlargement. In the former we have more or less evidence of inflammation in a state of progression: in the latter, the consequence only of inflammation is presented to us, the increased vascular action that occasioned it and the attendant fever having subsided. In chronic enlargement there are more decided proofs of general cachexia furnished, which are either not seen, or seen only in a less degree, in the enlargement preceding suppuration.

147. *The changes observed on dissection* of fatal cases of *hepatitis* and *its consequences* are fully stated in the section on the *Structural Lesions presented by the Liver*.

148. iv. The Diagnosis of Hepatitis will not detain me, as the descriptions given above comprise the chief distinctions between those states and consequences of the disease and other maladies which most closely resemble them. A very slight attention will distinguish between *gastro-enteritis*, or *duodenitis*, and *hepatitis*. The seat of pain or uneasiness; the swelling in the hepatic region; and the inflammatory character of the symptomatic fever, with the attendant phenomena, will point out the disease. In *gastro-enteritis* these characters are wanting, the fever attending it being more adynamic than in hepatitis. (See art. Gastro-enteric Disease, §§ 12, 13.)

149. The details furnished above also serve to distinguish *chronic pleurisy* with effusion from *chronic enlargement* and from *abscess of the liver*, as well as the differences existing between the several functional and inflammatory affections of the organ.

150. v. Complications of Hepatitis. — The several states and consequences of hepatitis very frequently occur in connection with other diseases, the hepatic malady being either *primary* or *consecutive* of these diseases. Although I cannot, within my limits, describe the several *complications* which thus arise, yet I will briefly notice the chief of them, as the mere suggestion of them will often lead to their recognition in practice, and to the not unimportant inquiry into the nature of their connection and succession.

151. *A.* I have already mentioned the great influence of *remittent* and *intermittent fevers* in causing *hepatic disease*. In many cases, the latter is almost coëtaneous with the former; and, in some instances, hepatic disorder precedes the periodic fever, and becomes developed into acute inflammatory, or even structural, disease, as the fever proceeds. In these the fever presents more or less of what has been called the bilious character; and the specific cause of the fever superadds a constitutional malady to the local affection, and thereby aggravates it. Such complications soon become familiar to physicians in warm miasmatous climates. Again, in many instances, the hepatic affection is developed in the progress of the fever, and in others it does not appear, until the decline of, or during convalescence from, the latter. In these circumstances, the substance of the organ is principally affected, and the form and course of the local disease are frequently obscured. In all cases of periodic fever, therefore, and especially if the attacks have been frequent or prolonged, the functions and state of the liver, and the region of the organ, should be carefully examined both during and after the disease. (See Fevers, Remittent.)

152. *B.* The *complication of hepatitis* with *dysentery*, *diarrhœa*, or *gastro-enteric disease* is one of the most frequent and most important which comes under the observation of the inter-tropical and Indian physician. The association often escapes observation, owing to the seat and nature of the hepatic malady; and the exact procession of the morbid changes is seldom so manifested as to admit of recognition. In some cases, the morbid secretions from the liver, either attending or preceding imflammatory disease in it, seems so to irritate the gastro-intestinal mucous surface as to inflame, and ultimately to disorganise, it. In others, disease of both the bowels and the liver appears to be contemporaneous; and in many the gastro-intestinal irritation is primary, and seems to be propagated from the duodenum along the ducts to the substance of the liver. This is, however, not so frequent a mode of extension as is supposed by some pathologists. In most cases of the association of hepatitis with dysentery or diarrhœa, this can hardly be considered to obtain; and although the vitiated secretions from a diseased liver may irritate and inflame the internal surface of the large bowels, thus occasion diarrhœa or dysentery, and indicate the priority of affection to be in the former viscus, still other instances will, if accurately observed, show an opposite course of disorder to this, namely, indications of diseased liver appearing either in the course, or upon the decline or disappearance, of the dysenteric affection. In these cases it has been supposed, that, phlebitis having been produced in the veins arising in the ulcerated bowel, it has been propagated to the portal vein and its ramifications, giving rise to infiltrations of pus in the interstices between the lobules, that have ultimately formed themselves into larger collections or abscesses. Others again believe that morbid secretions or other matters have been imbibed by the veins, and, mingling with the blood, have been carried to the capillaries of the liver, where they have excited suppurative inflammation in the substance of the organ.

153. Without denying the probability of either of these views, a change closely allied to them evidently takes place in many cases, and the purulent collections so often found in the liver after chronic dysentery bear the same relation to that disease, as other consecutive or symptomatic abscesses bear to maladies in which phlebitis occurs, as erysipelas, &c. In dysentery therefore it may be inferred, that, in the progress of ulceration, phlebitis of the capillary veins of the bowels sometimes occurs; and that the matter or pus thus formed in these veins passes with the blood into the portal circulation, where it irritates or inflames the minute ramifications of the portal vessels and the structure of the liver, giving rise to purulent infiltrations and collections in the organ, similar to those consequent upon phlebitis in other parts, but always occurring in the liver, and there only, because the morbid matter passes directly from the bowels into the portal circulation. As in other forms of con-

secutive or symptomatic abscess of the liver, so in this, the formation of matter is unattended by active or acute symptoms, or by the tumefaction of the organ generally preceding abscess consequent upon primary or active inflammation of it, as described above. (See section on *Structural Lesions of the Liver.*)

154. *C.* Of the association of inflammation of the liver with *gastritis*, some notice has already been taken (§ 118.). The extension of the disease from the concave surface of the organ to the stomach is not unfrequent, even without an abscess having formed; and in these cases the gall-bladder, ducts, and even the duodenum, are sometimes involved. More rarely, the inflammation seems to have extended from these parts to the concave surface of the liver, as shown by extensive organic lesions in the former, and by adhesions to the latter. In several instances of chronic disease of the digestive organs, with complete jaundice and obstruction of bile, with vomitings, &c., I have found the duodenum, the pylorus, and sometimes a portion of the stomach, firmly adherent to the liver; the pancreas greatly enlarged; the gall-ducts involved in the disease; the pylorus thickened and indurated, and its caliber remarkably reduced; the stomach enormously distended; the liver and gall-bladder variously altered, and the hepatic ducts loaded with dark bile. (See art. Gall-bladder and Ducts, §§ 18—24. *et seq.*)

155. vi. Prognosis.—*A.* In the *acute* and *sub-acute states* of hepatitis, the prognosis will depend upon the part of the organ especially affected, and upon the progress and consequences of the disease. In temperate climates, when hepatitis is treated early and is duly recognised, it terminates favourably in most instances — probably in thirty-nine cases out of forty; but in warm climates, and especially in the East, the proportion of fatal cases in those attacked by the disease varies from 1 in 20 to 1 in 7 *, as shown in the subjoined abstract from the returns made to the Army Medical Board. In warm climates, the natives are less subject to hepatitis than the inhabitants of temperate countries.

156. The circumstances which more particularly *indicate danger* are, the occurrence of the disease in cachectic, broken-down, or debilitated constitutions, especially among Europeans resident in warm climates, or in those previously the subjects of hepatitis; its affecting the substance of the organ, and its insidious progress and association with other diseases, especially with those of the bowels; its advanced progress before treatment had been prescribed, and the failure of judicious means employed at an early stage; and symptoms of incipient or advanced abscess, and fully developed hectic phenomena;—in short, whilst the symptoms of resolution (§§ 128.) show a favourable termination of the disease, those which attend the other terminations and consequences of it (§§ 129.) evince more or less risk; and, although they may not indicate extreme danger in several circumstances, and in many cases, yet in others, particularly where suppuration and hectic have been established, the chances of ultimate recovery are but few.

157. *B.* The prognosis in the *chronic states* of hepatitis varies with the changes and consequences of the disease, as manifested in different forms, stages, and cases of it; and depends upon circumstances connected with the patient and with the causes which produced the malady, as well as with those which may still continue to perpetuate or to aggravate it. Hence the physician will be guided in forming his opinion, not only in this form of the disease, but also in the acute and sub-acute states of it, by circumstances so numerous and varying, as to preclude the possibility of adverting to them with sufficient or satisfactory particularity. The soundness of his prognosis must necessarily depend upon the accuracy of his diagnosis, and of his recognition of modifying, exasperating, or countervailing circumstances and influences — upon his natural acumen, knowledge, and powers of observation.

158. vii. Treatment.—*A.* In the *acute* and *sub-acute states* of the disease, the propriety, and indeed necessity, of having recourse to energetic measures as early as possible are manifest. In warm climates, the delay, even of a few hours, may place the patient in danger. The first and most important means of cure is *blood-letting*; and, especially when the substance of the organ is affected (§§ 101.), it should be promptly and energetically practised. Mr. Martin justly observes that, "however long the disease may have existed, *provided there be no symptoms indicative of suppuration*, general blood-letting — repeated as the symptoms may demand — and copious in relation

* Stations.	Aggregate Strength during many Years.	Attacked with Hepatitis and Jaundice.	Died.	Proportions of Deaths to Admissions.
Canada	64,280	488	12	1 in $40\frac{2}{3}$
Nova Scotia and New Brunswick	46,442	384	10	1 in $38\frac{2}{5}$
Gibraltar	60,269	759	22	1 in 34^{5}
Ionian Isles	70,293	1168	58	1 in 20
Malta	40,826	857	47	1 in 18
Bermudas	11,721	168	6	1 in 28
Windward and Leeward Command, West Indies	86,661	1946	161	1 in 12
Jamaica	51,567	539	51	1 in 11
Western Africa	1,843	150	11	1 in 14
St. Helena	8,973	171	24	1 in 7
Cape of Good Hope	22,714	496	25	1 in 20
Mauritius	30,515	2508	122	1 in $20\frac{1}{2}$
Ceylon	42,978	2382	213	1 in 11
Tenasserim Provinces	6,818	488	29	1 in 17
Bombay	17,612	1084	62	1 in $17\frac{1}{2}$
Bengal	38,136	2412	174	1 in 14
Madras	31,627	3372	190	1 in $17\frac{3}{4}$

to age, health, and length of residence in India, must be instantly had recourse to; and the measure of depletion should be the sense of local and general relief, *with softening of the skin.*" This advice is equally applicable to the acute hepatitis of other warm climates, and of temperate countries. The patient should be seen in from six to eight hours after the first bleeding; and if vascular reaction has returned or has increased, as often observed, venesection must be again prescribed and performed, in the manner so often advised in this work.

159. Instantly after the first blood-letting, a full dose of calomel, conjoined with James's powder, or with some other preparation of antimony, ought to be given, generally in the form of a powder, and a saline purgative should be taken a few hours afterwards. These may be repeated at intervals, according to their effects, until the system be brought under the moderate influence of mercury. In the course of treatment, local depletions may be required. When this is the case, *leeches* may be applied to the anus, or to the hypochondrium or epigastrium, and be followed by fomentations and poultices; or cupping may be performed under the shoulder-blades. *Blisters* are generally beneficial when applied after vascular depletions have been duly practised; but they should not be employed until depletions are no longer required. During the treatment, the more cooling diaphoretics should be given at short intervals, and in such doses as will not offend or irritate the stomach.

160. The above comprises the most efficient means of treating the more acute states of hepatitis; yet there are others which are powerful aids; and one of those which have been mentioned requires more particular notice, as respects not only the propriety, but also the mode of prescribing it. I shall, therefore, and particularly on account of the great importance of the matter, consider the latter of these subjects before I discuss the former, and examine the questions: —1st. *As to the propriety of employing mercurials in hepatitis: — and,* 2d. *As to the mode of prescribing them in cases where their use appears to be required.*

161. *B. Of the Use of Mercurials in Hepatitis.— a.* The question, as to *the propriety of employing these medicines in hepatitis,* has been very generally answered in the affirmative by most physicians; and yet few agree as to the states of the disease in which they either should, or should not, be prescribed. There can be no doubt that these medicines have been employed, especially in India, in a most indiscriminating and empirical manner, and to a most injurious extent; and that even those who have used them the most liberally have themselves had no precise idea of their modes of operation, and even of the existing pathological conditions for which they were prescribed. Some physicians in the East Indies have contended, that hepatitis there is a different disease from that which occurs in this country; and, consequently, that views of the treatment of it in the one climate cannot be extended to the other. This, however, is only partially true: it is essentially the same malady, although occasionally somewhat modified, in both climates; and the principles of practice are the same in both, for similar states of the disease, slight alterations only being required, arising out of the persistent influence of the causes producing it, and the circumstances of individual cases. The mistakes and numerous evils to which they lead, of considering the hepatic diseases of India to be different from those of Europe, and of employing mercurials empirically in their cure, will soon become manifest to the practitioners in the former, if, indeed, they are not already manifest to many, and especially to the best educated and the most enlightened. I know, from repeated observation, that inflammations of the liver may be cured without mercury in this country, quite as well, as safely, and as quickly, as with it; but that there are certain states and consequences of these inflammations that require this medicine, and that are benefited by it more rapidly than by any other; and I believe that the same will be found to be the case in India, and in warm countries in general.

162. Some physicians prescribe mercurials in hepatitis with the intention of emulging the bile-ducts; others simply as a purgative; and some with the same view as in other inflammations, when it is desired to affect the constitution with them, and thereby to change the state of capillary action in the affected organ. Now these several views have been promulgated without any examination of the mode of operation of mercurials upon the biliary organs, and upon the assumption that they actually excite the organ, and enable it to discharge its functions. This assumption has arisen from the circumstance of an increased discharge of bile having followed the exhibition of them in many cases where this secretion appeared to be impeded or interrupted. Even those very writers who have argued for this mode of operation of these medicines, have employed them most inconsistently with their own views — even for acute inflammations of the liver, where, according to these views, they must have aggravated or perpetuated the morbid action which they were given to subdue.

163. Mercurials, like most other medicines, when employed in small doses, exert a *stimulant* influence for a short time upon living tissues; but, in large doses, this effect is either rapidly exhausted, or hardly produced, and a *sedative* operation results, which is the chief or the only effect usually observed. In doses either small or moderately large, they also exert a *qualitative* or *alterative influence,* relatively to the state of vital energy and vascular action, that becomes more and more manifest the more frequently they are prescribed, and the shorter the intervals between the doses. All the milder preparations, and the more acrid ones in a state of dilution, produce upon the capillaries of the parts to which they are directly applied, somewhat of an astringent effect, resulting most probably from the influences already assigned to them; these preparations diminishing for a time the vascularity of the surface, and modifying its vital actions. This is shown by inflamed or vascular surfaces becoming less inflamed and less vascular soon after calomel and the other milder preparations of mercury are applied to them. Such, then, appear to be the changes produced by the usual medicinal doses of mercurials upon the states of vital energy and vascular action of parts to which they are more immediately applied, — such, I infer, are their *topical*

effects upon living structures, in health and in disease; provided, however, that the vitality of the part be not remarkably depressed, or capillary action not altogether suppressed. Vital agents cannot influence dead structures, or structures approaching to this state, unless in as far as they may exert a chemical action, and then this action is confined chiefly to their antiseptic or septic agency, by combining with the tissues or with the fluids they contain.

164. The *consecutive* or *constitutional effects* of mercurials are equally important, and ought always to be considered in connection with the topical effects; for the former, in some cases, rapidly follows the latter, whilst in others they are produced with difficulty. The circumstances connected with this uncertainty of the consecutive operation of mercurials will be attended to hereafter. Having produced, or whilst producing, their topical changes, mercurials are absorbed and carried into the circulation from the external surface of the body, by means of the absorbents, and from the digestive canal, either by the lacteal absorbents or by the veins — if by the last, they will necessarily pass almost directly into the portal circulation. When carried into the blood, their effects are manifested with greater or less rapidity and intensity, according to existing states of vascular action and vital power; but, in ordinary circumstances, and in a time which bears some relation to the frequency and largeness of the dose, they affect these states; increasing the frequency, and impairing the tone, of the former, and depressing the latter; and, ultimately, they weaken or otherwise change the crasis or coagulability of the blood, and even the vital cohesion of the several tissues.

165. Owing partly to their local influence, and the sympathetic extension of that influence, and partly to their absorption, mercurials soon increase the exhalations and secretions from the cutaneous and mucous surfaces, and the secretions of glandular structures, whilst they diminish exhalation into serous or shut cavities. Those secretions in which are excreted effete or injurious materials from the blood, as the bile, the salivary and pancreatic fluids, the menstrual discharge, &c., are especially augmented by large or repeated doses of mercurials; nutrition, however, being impaired, and absorption increased, especially of interstitial or imperfectly organised deposits. If the exhibition of these medicines, in frequent or large doses, be persisted in, these effects become more manifest: secretion and excretion, more especially salivary secretion, are greatly augmented; the crasis or coagulability of the blood, that is often increased at first by them, is afterwards either weakened or altogether lost; vital cohesion is remarkably impaired in some tissues, so much so as to amount to gangrenous softening and sphacelation; the flow of the saliva becomes excessive; absorption and vital exhaustion are rapidly augmented; and low irritative fever, consequent upon these latter conditions and the transit of morbid or effete elements into the circulation, during the rapidity of absorption, exhausts and ultimately sinks the patient, either with or without certain local effects of a still more remarkable nature, as sloughing of the gums and cheeks, caries of bones, &c.

166. These being the local, consecutive, and progressive effects of mercurials, their influence upon diseases, particularly those of glandular organs and serous membranes, may be more accurately inferred. From these effects we may explain their beneficial influence in many instances of inflammatory irritation or action in the villous coat of the stomach and small intestines, when taken internally; and their good effects, when given in repeated doses for the removal of inflammation of serous membranes and its consequences.

167. In the acute and sub-acute disease of the membranes or surface of the liver (§ 113.), large and repeated doses of mercury are often most beneficial, not only in equalising and lowering excited vascular action, but also in diminishing or preventing the exudation of lymph on the inflamed surface, especially after vascular depletions have been duly resorted to. When the substance of the liver is inflamed, a similar recourse to mercurials is not so generally advantageous, unless the inflammation be consequent upon, or attended by, active congestion of the organ or accumulations of bile in the biliary ducts, and blood-letting has been largely premised. When the pulse is quick, soft, and irritable, and the bowels much relaxed or dysenteric, mercurials are frequently more injurious than beneficial; and attempts then made to produce their usual effects upon the mouth and salivary glands are either unavailing, or productive of injury by accelerating the accession or progress of suppuration.

168. The propriety of having recourse to mercurials in the more acute inflammations of the liver depending thus upon the peculiarities of individual cases of the disease, general rules as to the employment of them cannot be stated with sufficient precision. Much should depend upon the pathological deductions formed by the physician as to each case which comes before him. Authorities on the subject are contradictory, and are more calculated to perplex than to guide the inexperienced.

169. Formerly mercury was employed in hepatitis, by Indian practitioners, as a substitute for blood-letting. The injurious effects of this practice were first exposed by DR. BALLINGALL. About the same time or soon after he wrote, I endeavoured to show that mercurials should be employed only to aid not to supersede blood-letting, to remove accumulations of bile in the biliary passages and liver, and to restore the secreting functions of the organ. Many of the writers on hepatitis during the latter part of the last century and the early part of this, relied solely or chiefly upon the use of mercury for the cure of hepatitis, and yet had no precise ideas as to its operation, beyond the production of its specific effects; and the majority of them, moreover, never discovered, notwithstanding the extent of their unfortunate experience, that it was difficult to produce these effects whilst inflammatory reaction continued, and almost impossible when suppuration had commenced. Still, believing or being told that mercury was the cure for the disease, they continued to dose their victims with it in every instance and in all circumstances, actually producing thereby most of the unfavourable consequences of the malady and other serious affections of related organs. The rectum-operators of the present day have been under no small obligations to the calomel and mercury hallu-

cination of the last half century, for the extensive field of practice with which it has furnished them. Nor have they alone experienced the bliss of the practice, for both East Indian and British practitioners have in some way or other reaped the advantages accruing from it and from the happy ignorance which frequently, if not generally, prompted it. The slightest *dyspeptic*, often denominated *hepatic* disorder, was a sufficient indication, with the great mass of the profession, for the exhibition of five or six grains of calomel every night or every other night in this country, and of twenty grains every night in India; and the tenesmus and other consequences of irritation of the rectum thereby produced, were rarely recognised as the necessary results of the practice, but viewed as a part of the disease requiring only a repetition of the same means for its removal, until fatal dysentery, abscess of the liver, or other disorganising lesions were produced, and the fatal issue, which ultimately supervened, was most innocently and complacently viewed as the uncontrollable course and consequence of the malady, instead of the common result of a treatment prescribed with complete ignorance of the nature of the disease and of the operation of the means used to cure it. This is no over-charged statement. Numerous proofs of it have fallen under my observation in this country. I have seen still more numerous proofs of it in the hospital books kept at an East Indian Presidency, and some of these books I can still refer to and even produce. There is, perhaps, no other disease that more fully proves how very little mere experience — the blind experience of exclusive practitioners, incapable of close observation and legitimate deduction — serves the advancement of real knowledge, than the history of the treatment of hepatitis during the last seventy years. The following abstract of the opinions of a few of the many writers on diseases of the liver, — of those more especially enlightened by Indian practice and extensive experience, — shows the amount of obligation which is still their due.

170. Mr. Annesley recommends twenty grains of calomel to be given at bed-time, and a purgative in the morning, daily. In some cases, and especially in those where the membranes are chiefly affected, or where bilious engorgement of the liver exists, two or three or even more of such doses may be of service; but there are other cases, equally numerous with the foregoing, where this practice, continued as Mr. Annesley advises it, until salivation is produced, would be more injurious than beneficial, or even most dangerous or fatal. Dr. Chapman, on the other hand, in advising small doses of calomel, considers, with considerable truth, very large doses to be productive of debility, irritation, and the irregular febrile movement caused by irritation. Mr. Malcolmson, Mr. B. Clark, Dr. Dick, and others, also consider large doses of calomel to be injurious in a large proportion of acute cases, and in a still larger proportion of chronic cases, and are of opinion that disease of the liver is more apt to return when thus treated. Mr. Twining, also an Indian practitioner, believes mercury to be of no greater efficacy in hepatitis than in other inflammations, in most of which it is secondary and subsidiary to bloodletting. In answer, however, to Mr. Twining, Mr. Martin remarks that " It is for the very reason that calomel assists powerfully both in '*drawing off*' accumulations, and in procuring '*increased secretion*,' that it proves of such value in aid of blood-letting (in hepatitis). In short, it is by this very double action of purging and increasing secretion at the same time, that mercury relieves the loaded and inactive vessels of the diseased gland, — not to speak of the other acknowledged influences of this mineral, such as its increase of *all* the secretions and excretions of the body, — its influence on the capillary circulation — its febrifuge effect — the peculiar specific power ascribed to it by Gooch and other authors as an antagonist to inflammations, whether general or local — its power over the absorbent function — its power of unloading at the same time that it gives a new impulse to the vascular system — its peculiar power in removing viscid and tenacious intestinal secretions — its alterative and solvent effect on the blood — these are the uses and actions ascribed to mercury by the ablest of our physicians and surgeons, and they are such as place this remedy second only in order to blood-letting, in all the more acute hepatic affections of India." Mr. Martin has here given a favourable and an able view of the operation of mercury; but the practitioner cannot expect to find it fully realised in more than a portion of the cases in which he will employ this mineral. Still, in those acute cases where these effects require to be produced, there is no other substance that can be so well depended upon as it when judiciously administered. Nevertheless, whilst we endeavour to obtain these effects, we must not overlook its more injurious influences and neglect means or ways, in respect both of dose, mode of exhibition and combination, that may prevent or counteract them.

171. Dr. Saunders remarks, that it is a matter of dispute amongst those who recommend calomel as a specific in liver complaints, " whether it acts by purging or by exercising any local operation on the biliary ducts, or by acting on the general system, and ultimately by salivation, it being a prevailing opinion, that when the system is impregnated with mercury, suppuration of the liver seldom takes place;" but the question is not as to which of these ways the medicine operates, but as to whether or not it acts in all these ways, producing moreover other effects, such as have been already particularised, certain of these effects being more prominently produced in some circumstances and cases than in others.

172. *b*. The question, then, is not so much as to the propriety of exhibiting mercury in acute hepatitis, after blood-letting has been duly premised, and repeated in cases requiring its repetition, for that is very generally conceded with the exception I have made above (§ 167.), but as to the quantity and manner in which it should be given. Although the difficulty of answering this question has been already shown (§ 170.), yet some have attempted to answer it with more precision and universality of application than is compatible with the rational employment of medicinal agents to control morbid actions. On the one hand, we have Mr. Annesley's twenty grain doses of calomel which are sometimes required, but which have been recommended by him as the almost only mode of employing this medicine: on the other, we find Mr. Curtis, another Indian

practitioner, advising only three grains of calomel to be given with four each of soap and rhubarb, every night and morning, in which combination the calomel is decomposed and the patient takes only the oxide of mercury. In many cases, this latter plan will be preferable, especially when it is desired, as in states of inaction of the liver consequent upon inflammation or connected with congestion, infarction, or enlargement, to stimulate the functions of the organ and promote the absorption of morbid deposits; but in other cases, where the objects are to derive from the seat of disease, and to arrest with the utmost speed inflammatory action and its consequences, scruple doses of calomel every night, or smaller doses taken more frequently, will be more efficacious. Many years ago I stated, as a reason for exhibiting mercury with decision, in order to arrest the progress of hepatitis, that the salivation thereby produced and the determination of the fluids to the salivary glands, acted as a powerful derivative from the liver, allowing the morbid action in this organ to subside, and the healthy functions to be restored.

173. *c.* Another question suggests itself—namely, are there other means which may be used in aid of blood-letting, or after vascular depletions have been carried sufficiently far, in order to procure a free discharge of bile, and prevent suppuration? I believe that there are, although further experience is required to determine fully the extent of benefit to be derived from them, and the particular circumstances in which they are more especially indicated. Some of these may be employed either as substitutes for, or in aid of, mercury; the mercurial being taken at bed-time, and the other remedies in the morning and course of the day. Amongst these the bi-tartrate of potass is the most efficacious in promoting a discharge of bile, in removing viscid and tenacious secretions from the intestinal mucous surface, and in lowering inflammatory action. It should, however, be prescribed in full doses—from one to three or four drachms twice or thrice daily, in the form of electuary; and it is often advantageously conjoined with small doses of tartarised antimony, or with biborate of soda, &c., according to circumstances. The *sulphate* and *bisulphate of potash*, the *phosphate of potash*, the *nitrate of soda*, and other neutral salts, are also of service when given in full or frequent doses, and judiciously conjoined with appropriate medicines.

174. *C. Acute hepatitis affecting Europeans residing in the East Indies or in warm climates* requires a similar treatment to that already advised; the only difference being the necessity of greater activity and promptitude in the use of the means of cure. *Blood-letting*, general or local, or both, should be freely practised. A full dose of calomel — from ten to twenty grains — may be given at bed-time, as it will not disturb the rest of the patient by its operation, but will act upon the secretions until morning, when a brisk purgative should be taken, to carry off accumulated fæces, and those morbid secretions which the calomel had prepared for removal. The purgative that may be given in the morning may be either any of the saline solutions above-mentioned, or the compound jalap powder, or the Seidlitz powders.

175. In warm climates, the rest of the patient ought not to be disturbed by the operation of purgatives during the night; and, when it is necessary to continue the mercurial without disturbing the patient, it may still be given with one or two grains of opium, and with one grain of ipecacuanha, if the stomach be not irritable. In some cases, particularly when the bowels are irritated, an anodyne draught, or an anodyne enema, may also be administered at bed-time. These precautions against disturbing the patient during the night require especial attention in some localities, and where there is a free ingress of the night air, and where the nights are cold, damp, and chilly.

176. If the calomel at bed-time, and the purgative in the morning, saline diaphoretics and refrigerants being given in the course of the day, be followed by affection of the mouth, as usually happens in the course of three, four, or five days, when vascular depletions have been duly premised, then it is sometimes necessary to induce ptyalism as quickly as possible, particularly in the circumstances, and with the exceptions, above noticed (§ 167.). The reason which influenced me in thus recommending the speedy induction of ptyalism for inflammation of the substance of the liver, conjoined with vascular or biliary congestion, was, that where the full operation of mercurials on the system and ptyalism are induced speedily, a derivation from the seat of disease is effected, and the functions of the liver are more readily and completely restored. But, if these effects are not soon produced, the means should be relinquished. If there be any reason to believe that suppuration has commenced, symptoms of it having appeared, then mercurials ought not to be prescribed, inasmuch as they will not then produce these effects upon the salivary apparatus, but increase the debility and irritability of the patient, and accelerate disorganisation.

177. Where much *disorder of the bowels* exists or appears in the course of the disease, calomel, or even the mildest preparations of mercury, as the hydrargyrum cum cretâ, &c., should be given with great caution; and, where it is clearly indicated, it should be combined with opium, ipecacuanha, &c. And, in order to protect the mucous surface of the large intestines from the irritation of the morbid secretions passing over them, emollient enemata ought to be administered.

178. When calomel has been given as above stated, its operation upon the secretions, excretions, and system in general, will be induced with a celerity in proportion to the extent to which vascular depletion has been pushed. But, in many cases, the symptoms disappear so quickly after blood-letting, as not to require the further exhibition of calomel at bed-time. When this is the case, and the patient is recovering rapidly, the secretions and excretions having assumed a healthy appearance, there is no further need of mercurials, although their specific effects may not have at all appeared. If they have taken place, the circumstance may be viewed as favourable; but to continue them after the secretions are healthy and the symptoms of the disease have subsided, is most mischievous, by exhausting vital power, and by over-exciting or otherwise disordering the biliary organs.

179. If, after the means above advised have been employed, the secretions and stools continue still

morbid; if any disorder can be detected in the seat of the liver or in the abdomen; if the tongue be loaded or furred; and the countenance be sallow or unhealthy — the speedy induction of ptyalism will then be often judicious and beneficial. If, however, this effect be not produced in the course of four or five days, it will be detrimental to make the attempt for a longer period. The means by which the mercurial action may be speedily induced are various; but mercurial inunction, thrice daily with mercurial ointment conjoined with camphor, the patient continuing the full dose of calomel at bed-time with James's powder, or ipecacuanha and opium, is most to be relied upon. Combining calomel with any of the preparations of antimony tends to hasten the specific effects of the former, particularly after blood-letting. If irritation of the large bowels supervene, emollient enemata should be administered; and a cooling aperient may be taken occasionally, to evacuate the morbid biliary and intestinal secretions which rapidly accumulate in hepatic diseases, and which, if not removed from the bowels, irritate, inflame, and ulcerate the parts in which they lodge. As soon as ptyalism is produced mercurials should be intermitted, and gentle tonics, refrigerants, and alkaline carbonates, saline aperients, and a light abstemious diet should be prescribed. It is not necessary, in hepatic diseases, to continue this effect upon the salivary apparatus above a few days; for its influence upon the complaint is produced in a short time.

180. In the sub-acute and less active cases, particularly those which have been of somewhat long standing, or which have supervened on previous disorder of the liver, deobstruent and saline aperients alternated with mild mercurials and alteratives, and occasionally with a full dose of calomel at bed-time, is generally beneficial, particularly after local depletions have been duly prescribed. If these means fail, then the full effects of mercury should be induced as quickly as possible; after the appearance of which mercurial medicines may be laid aside, at least for a time.

181. When great congestion and enlargement of the liver accompany the inflammatory state, repeated leeching, or cupping under the scapula, and de-obstruent and chologogue aperients, are requisite. After the inflammatory action is entirely removed, blisters, applied to the region of the liver, are generally useful; and, in the more chronic or obstinate cases, the blister should be kept open, or an issue made in the side. Laxatives and aperients act more copiously after vascular depletion, and blisters applied on the region of the liver promote the secretion and excretion of bile. In all instances the evacuations should be inspected by the physician, as they furnish the chief part of the information required as to the state of the disease and the effects of remedies. The patient's or the nurse's account of them ought never to be trusted.

182. If fulness, swelling, or congestion continue after inflammatory action is removed, and after deobstruent aperients have been duly employed, and if the disease thus assume a chronic form, the means hereafter to be recommended become appropriate. In this state of disease, I have prescribed small doses of the *iodide of potassium*, with *liquor potassæ* and *decoction of taraxacum*, and occasionally the spirits of nitric ether with marked advantage. A liniment rubbed on the region of the liver, or an embrocation, or deobstruent plaster, in this situation, is also of service.

183. After the acute symptoms have yielded, and the digestive functions appear restored, still much torpor of the liver often continues, and a course of gentle laxatives and deobstruents, combined with bitters and mild tonics, is often required, in order to assist the vital action of the organ, and to excite the sluggish bowels. If any enlargement still exist in these cases, either the deobstruents just mentioned, or small doses of PLUMMER's pill, or of blue pill, should be given at night, and weak solutions of salts in the morning. But care should be taken to detect any remains or return of inflammatory action, and to remove it by local depletions and cooling diaphoretics. In many of these cases, the treatment advised for chronic hepatitis is appropriate, particularly the *nitro-hydrochloric acid* bath or lotion, and the *nitric* and *hydro-chloric acids*, or either of them singly, taken in any of the simple beverages used by the patient. When torpor of the liver remains after acute hepatitis, a course of these acids promotes the re-establishment of the biliary secretion and the return of strength, particularly when conjoined with mild tonics and a suitable regimen.

184. *D. Treatment of the Complication of acute Hepatitis.* — These complications chiefly result from the neglect of treatment of the primary disease, or of the early stage of the disease, and more especially from the neglect of blood-letting. — *a*. When the concave or posterior part of the liver is inflamed, the extension of disease to the *stomach*, *gall-bladder*, or *ducts*, is often rapid, particularly in warm climates, if an appropriate treatment be not promptly employed. In this complication general and local depletions and full or large doses of calomel, with or without opium, are especially requisite; and from having recourse to these, the state of the pulse and feelings of the patient should not deter the physician, as the symptoms will all improve after resorting to them. Subsequently, external derivation, the semicupium, or pediluvium, &c., may be prescribed. Irritating purgatives should not be given by the mouth; but the action of the bowels should be procured by means of purgative enemata. The treatment of this complication is, however, not different in any respect from that of the simple disease; it requires only to be more energetic and more promptly resorted to.

185. *b. Diaphragmitis*, *pleuritis*, *pneumonia*, or even *pericarditis* is not infrequently associated with acute hepatitis, particularly when the convex surface of the liver is affected; and it is sometimes difficult to determine, especially when the patient comes under treatment late in the disease, which of these was the primary affection. In some cases, disease commences in the form of pleuritis and extends to the diaphragm or liver or both; but more frequently it attacks first the superior surface of the liver, and subsequently the diaphragm, the pleura, and lastly the lungs, or more rarely the pericardium. The respiration, expectoration, and physical signs will indicate the presence of one or more of these complications, of which *diaphragmitis* is the most frequent, as respects the affection of either of its serous surfaces, although it is not

that which is most frequently detected during life. (See art. DIAPHRAGM, §§ 8, *et seq.*) — In some cases, however, the liver rises, in consequence of the congestion and swelling attending inflammation of it, so high in the right thoracic cavity, as to simulate either simple pleuritis, or pneumonia, or the complication of hepatitis with these. When hepatitis is neglected, or inactively treated, extension of the disease to the diaphragm, thoracic membranes, and lungs, is of frequent occurrence, both in warm and in temperate climates. In these complications, active depletions, and the antiphlogistic treatment and regimen in all their details, are required. In order to aid in lowering vascular action, and to prevent, or to remove, the consequences of inflammation, full doses of calomel with James's powder, with or without opiates or anodynes, according to the circumstances of the case, should be prescribed. Antimonials ought never to be omitted whenever there is reason to suppose that disease exists in the thorax, or is advancing thence from the liver. They may be given so as to occasion some degree of nausea; but it is doubtful whether or not they should be prescribed so as to produce full vomiting when the liver is unequivocally inflamed; for, although vomiting may relieve the affection of the lungs, it may aggravate that of the liver. In some cases, good has indirectly resulted from the exhibition of an emetic, in developing and rendering more manifest an obscure disease, and thereby leading to a more energetic and suitable treatment, than would otherwise have been employed. Where inflammatory action is subdued, these blisters, rubefacients, or the tartarised ointment may be applied; and if the case become chronic, a seton or issue may be made in the side. In this complicated state of disease mercurial medicines should be given in combination with antimony, camphor, or opium, or with either or all, according to circumstances. If no effusion has taken place into the thoracic cavity, vascular depletions having been duly employed, benefit will be derived from a warm terebinthinate embrocation applied over the seat of uneasiness; but if effusion have taken place, the repeated application of blisters, persistence in the use of mercurials until the mouth is slightly affected, and the continuance of this affection by means of the milder preparations every night, whilst small doses of the hydriodate of potash are given in the course of the day with the liquor potassæ, will generally remove the disease, if extensive disorganisation have not taken place.

186. *E. Treatment of Abscess of the Liver.*—When the symptoms noticed above (§§. 131, *et seq.*) indicate commencing or even impending suppuration, then mercurials ought not to be prescribed; for they will only lower the vital powers, and extend the local disorganisation. Moreover it has been shown by MARSHALL, MALCOLMSON, GRAVES, STOKES, and others, that it is impossible to affect the salivary glands with mercury when an abscess has once formed; and I have long ago insisted that it is also difficult to produce this effect whilst acute inflammatory action exists, or is unsubdued. Although matter may be actually forming, the inflammation producing it does not cease upon this event. Suppuration in parenchymatous structures especially is a consequence, but not a termination, of inflammation. In some cases, inflammatory action continues with much activity until the abscess makes its way either externally or into some viscus or cavity; whilst in others it subsides considerably, the circulation exhibiting merely the irritable state, and the hectic symptoms usually attending the formation or the existence of matter in vital organs. When, therefore, it is inferred that an abscess is formed, it is necessary to control, as much as possible, the state of vascular action, locally and generally, particularly where we find, from the existence of pain, excited state of the tongue, and character of the pulse, that inflammatory action is considerable. In these cases, small or repeated local depletions, cooling diaphoretics, and a refrigerant and febrifuge regimen, are the most appropriate means. By these the morbid action should be diminished, whilst vital power is preserved by attention to air and diet. Whilst depleting locally and prescribing aperients in order to evacuate morbid secretions and fæcal accumulations, which always increase disorder when allowed to remain, the physician will often see the necessity, in these cases, of supporting the vital functions by a gently nutritious and cooling diet, allowing the patient no more food than the digestive organs can properly dispose of. When these functions fail he will endeavour to rally them by gentle tonics conjoined with refrigerants, as the nitrate of potass, the hydrochlorate of ammonia, or the mineral acids; knowing well, that, if these functions are allowed to sink in the struggle they have to endure against the organic changes going on in the liver, the purulent formation becomes the more extensive and formidable.

187. *a.* When there are general tumefaction and throbbing in the region of the liver, with pain, firmness of pulse, and erethismal appearance of the tongue, — but without either rigors, cold sweats, faintings, or a sense of sinking, anxiety at the scrobiculus cordis, or night perspirations, then local depletions may still be freely employed; but the amount of such depletions should depend upon the strength of the patient, his age, and on what has previously been done. In this state it is generally too late to have recourse to mercurials, excepting as aperients. They will merely add irritability to an irritable pulse, and lower vital power. In general, the abscess which is forming has not yet materially deteriorated the circulating fluids; and leeches applied over the seat of swelling, and followed by a succession of warm poultices, may tend both to lower the local action and to favour the extension of the matter to the surface.

188. When formications, rigors, cold, or profuse sweats, a sense of sinking, and other signs of change in the circulating fluids, and of vital depression are present, even local depletions will then be injurious, and mercurials not less so. But the nitro-hydrochloric acid, or the nitric acid, taken frequently, or in the patient's usual drink, is often grateful and restorative, especially if it does not disorder the bowels. If it have this latter effect the tincture of opium should be used along with it. Either of these acids may also be taken in gentle tonic infusions. When it becomes still more necessary to support the powers of the system, the sulphate of quinine with sulphuric acid, the infusion, decoction, or other preparations of cinchona, with chloric acid, or chlorate of potash, or with liquor potassæ, or the alkaline carbonates, may be severally prescribed.

189. As an hepatic abscess advances externally the diffuse swelling is gradually changed to a distinct tumour, which generally becomes softest at its apex or most prominent part. The tumour is attended by an expanded and firm base. If adhesions have formed between the inflamed surface of the liver and the abdominal parietes, the most prominent part of the swelling is soon after somewhat red and hot. When an abscess forms in the concave part of the liver, although much general swelling is evident in the region of the organ, yet a distinct tumour is rarely detected, unless the abscess be seated in or near the anterior edge of the viscus. When the symptoms indicate the existence of abscess, in connection with prominent disorder of an adjoining viscus, no distinct tumour appearing externally, it may be concluded that the abscess is making its way towards or into that viscus. In most of such cases little more can be done than to support the powers of life, without exciting vascular action, and to evacuate morbid secretions.

190. *b.* If the abscess point upon, or adhere to, the diaphragm, dyspnœa, thoracic oppression, anxiety at the præcordia, cough, hiccup, or a suffocating sensation, are generally present, and require the exhibition of anodynes, antispasmodics, and aperients. If pain be complained of and the pulse has not become weak or irritable, a few leeches may be applied in the direction of the diaphragm, or over the sternum. If the abscess open into the bronchi, after adhesions have formed between the several serous surfaces intervening, the chief intentions are to palliate the several thoracic symptoms, and to support the strength of the patient. If adhesion of the pleural surface does not take place, the abscess may break into the thoracic cavity, and give rise to all the phenomena of *Empyema.* (See PLEURA.) Where an abscess of the liver finds its way to the bronchi, the sudden irruption of the matter is often attended by signs of impending suffocation. In order to relieve this, the patient ought to be raised up, and warm fomentations should be applied to the chest and region of the liver. When the abscess has burst in this situation, benefit will sometimes be derived from nitric acid solution conjoined with laudanum, hyoscyamus, or conium. When the tongue is moist, the expectoration easy, copious, and purulent, and the patient does not complain of much pain, the pulse being devoid of hardness or sharpness, the infusion, or even the decoction of cinchona, may be tried, with an acid and narcotic, the bowels being duly regulated and evacuated. If night perspirations, with loss of strength and appetite, or with other signs of exhaustion supervene, the same means, in still more efficient forms, or the mistura ferri composita, may be prescribed. Where it is requisite to exhibit an aperient in these cases, the decoctum aloës compositum with the spirit. ammon. arom., or the compound infusion of gentian and senna, are the most appropriate.

191. *c.* If abscess of the liver is apparently pointing upon the stomach, as indicated by some difficulty in swallowing, by great thirst, by vomiting soon after substances are taken into the stomach, or by general irritability of this organ, or a pumping up of its contents, sometimes by jaundice, and by the sitting or semi-recumbent position of the patient, little can be done beyond palliating the more urgent symptoms. Large or full doses of opium may be given; and the mineral acids may be taken in the patient's beverage. The compound infusion of roses, or the infusion of calumba, may likewise be tried with laudanum, or with other narcotics. Hydrocyanic acid and creasote may also be employed. In one case, I prescribed the creasote with opium with temporary relief. The bowels should be evacuated chiefly by enemata. When the abscess pointing on the stomach is large, considerable tumefaction is observed in the region of the liver; and when it makes its way into the stomach, death generally follows immediately afterwards. In a case to which I was lately called into Montgomeryshire, this occurred; the swelling and bulging of the right hypochondrium and epigastrium being remarkable, in addition to the other symptoms, and to deep jaundice. When the abscess is smaller, death is less immediate.

192. *d.* If the symptoms indicate that hepatic abscess has opened into the large bowels, the indications are to palliate the urgent symptoms and to support vital power. In some cases, the abscess actually opens in this situation, without the event being detected; the occurrence being mistaken for the frequent complication of chronic diarrhœa, or dysentery, with inflammation of the substance of the liver. When, however, the abscess is large, the change observable in the hepatic regions, and the state of the evacuations, often indicate the occurrence. In these cases, the chief intentions are, to support the strength of the patient, to soothe the irritation in the bowels, and protect their internal surface, by administrating emollient and demulcent enemata. The warm bath, hot or rubefacient embrocations applied over the abdomen, and the nitric acid or nitro-hydrochloric acid, in demulcent and gently tonic vehicles, with laudanum, or with the compound tincture of camphor, &c. are also sometimes beneficial. In these cases, the abscess may refill, and open again in the same or in another part of the bowel, most commonly in the former; and although death follows in the great majority of cases, recovery sometimes takes place.

193. *e.* It is not improbable, that one or more abscesses may form in the substance of the liver, and that, after having increased to a certain extent, or remained stationary for a considerable period, they may either partially * or altogether be absorbed, without opening either externally, or into any other part, and the patient entirely recover. Proofs of this occurrence have been furnished by the history of cases, and by post mortem examinations, where the liver has presented extensive cicatrices, or marks of the seat of old abscesses, from which the matter had been absorbed, and the internal surfaces had adhered, as described in another section (§§ 212, 213.).

194. This favourable result occurs chiefly when the powers of the constitution are not allowed to sink, and when the absorbed matter is freely eliminated by the kidneys, before it accumulates in, or contaminates, the blood so as to give rise to the

---

* It is not unlikely, also, that certain deposits assuming a semi-consistent or cheese-like appearance, and varying from one to several in number, occasionally found in the liver, particularly in Europeans who have resided long in the East Indies, are merely the more consistent and albuminous parts of pus, the aqueous portions of which had been absorbed.

severer forms of hectic, and all its consequences. It is very probable that the chronic diarrhœa and dysentery attending abscess of the liver are owing to the effect produced upon the glandular apparatus, and on the villous surface, of the intestines, by the purulent matter absorbed into the circulation, particularly when it is not sufficiently eliminated by the kidneys.

195. *f.* The *diet* and *regimen* of the patient should be carefully attended to, and should be so regulated, during the course of hepatic abscess, as not to excite or increase febrile action, or to impair the powers of life. The farinaceous kinds of food taken in sufficient quantity for the wants of the system and powers of digestion, as tapioca, arrow-root, sago, rice, rice-milk, bread and milk, bread-puddings, stale bread, biscuits, jellies, &c., are generally most appropriate, although cases occur in which other articles of diet, according as they are relished, digested, or agree with the patient, may be permitted. When animal food is allowed either to support the system, or during convalescence, the lightest kinds of fish and white meats should be preferred, and taken in small quantity.

196. *g. The external opening of hepatic abscesses*, and the best modes of accomplishing this end, have engaged the attention of several writers, and very discordant testimony has been furnished by them of the success of the operation. There are numerous circumstances which influence the results of these cases: — 1st. The age, diathesis, and constitutional powers of the person: — 2d. The size and pathological associations of the abscess: — 3d. The existence of two or more abscesses: — 4th. The situation, particularly as respects the more external part of the organ: — 5th. The existence or non-existence of adhesions between the surface of the liver and the abdominal parietes: — 6th. Redness and prominence over the seat of the abscess: — and 7th. The states of severe or advanced hectic and protracted diarrhœa, or chronic dysentery. Of these more important circumstances, external redness and prominence over the seat of abscess, as indicating the existence of adhesions and a somewhat external or superficial position of the purulent collection, and sufficient constitutional power to bear the more immediate and the contingent effects of the operation, are the chief indications for entering upon it. Mr. Bell states that Dr. Dick, a physician of extensive experience in the diseases of India, found that the application of caustic to the part at which an abscess is pointing externally, with a view of opening it gradually, is sometimes followed by absorption of its contents, and by the recovery of the patient. This being the case, he was led to consider severe external irritation, over the seat of the abscess, as a most efficacious mode of favouring the absorption of the contained matter; and to recommend the application of caustic as the best means of procuring its external discharge. Dr. Graves advises an incision to be made through the integuments over the most prominent part of the external swelling, dividing the more superficial muscles, and keeping the wound open by a plug of lint. Mr. Annesley recommends the operation only when external redness with some degree of pointing, indicates the adhesion of the surface of the abscess to the abdominal parietes, and prefers the lancet to the trocar in performing it. He objects to the latter on account of large flakes or curd-like matters being contained in some abscesses, which cannot pass through the canula, but are retained whilst the more fluid parts only pass away. Having made the external excision large and with caution, until the peritoneum is exposed, fluctuation will be felt. An abscess lancet should then be introduced, and the abscess opened to the full extent of the external incision, which ought to be from two-and-a-half to three inches in length. Care ought always to be taken that the opening do not extend beyond the limits of the adhesions which have been formed. Being fully evacuated, the cavity is directed to be filled with lint, in order to give a mechanical support to the excavated parts, and the wound to be dressed with compresses and bandages in the usual way.

197. Of these several modes of procuring the external discharge of hepatic abscess, that advised by Dr. Dick, when aided by appropriate internal and constitutional treatment, is evidently that which is most congruous with pathological conditions, and with an enlightened experience. To fill the cavity of the abscess with lint, as Mr. Annesley advises, is merely to admit the air, and to promote a more copious secretion of pus from the internal surface of the abscess: it cannot aid granulation and contraction of the cavity, but will increase the discharge, aggravate the hectic symptoms, and sink the patient with greater rapidity, as in all other cases where large internal abscesses have a free external opening, permitting the action of the air. In hospitals, and in low, damp, crowded, or miasmatous situations, this mode of procedure is particularly dangerous. I believe that, in whatever way the abscess may be opened, the orifice should be completely shut after the matter is discharged, so as completely to exclude the air, even although it may be necessary to reopen it oftener than once, when matter re-collects. After the abscess has been opened, it is necessary to attend to the diet and regimen of the patient, to support the constitutional powers by means of mild tonics, or tonics conjoined with refrigerants, and to promote and correct the secretions and excretions by alteratives and restoratives.

198. *F. Treatment of Chronic Hepatitis.* — *a.* I have shown above that the chronic states of hepatitis are often similar to the acute, and differ chiefly in the activity or duration of the disease, in the structure chiefly affected, and in the more frequent association of organic lesions with the former than with the latter. The nature, however, of these lesions is seldom manifested through life, unless in as far as they may be attended with enlargement of the organ, and with deficiency of bile, or with jaundice; and even these are often equivocal. Although the bile is generally in smaller quantity, more remarkably changed from its healthy characters, and more frequently obstructed where the internal structure of the liver is chronically inflamed than when the surfaces are the seat of acute disease, yet the exceptions to this are so numerous as to forbid great reliance being placed upon it as a basis for indications of cure. The circumstances of chronic hepatitis being generally the cause of a great majority of the lesions of structure found in the liver, and of itself being as frequently a sequela of the acute disease as a primary affection, ought to be kept in recollection, in determining the treatment

that should be pursued. The forms of chronic hepatitis which are most readily recognised, and are most commonly treated as such, are those which are characterised by enlargement, by a scanty and depraved state of the bile, dyspepsia, and general ill health, low spirits, a sallow countenance and emaciation, particularly when they follow the acute disease, or periodic fevers, and occur in warm climates. In these cases, the treatment should depend upon the previous disease, upon the antecedent treatment, and upon the duration of a residence in a warm climate. If much mercury has been already prescribed, if the constitutional powers are much reduced, mercurials, vascular depletions, and drastic purgatives, are inappropriate, and recourse ought to be had to the *nitro-hydrochloric acid bath*, which should be steadily persisted in for a month or six weeks. Whilst it is being employed, or previous to a course of it, a vapour or warm bath should be taken two or three times, and followed by friction of the general surface; but the occasional recourse to the vapour or warm bath is preferable. At the same time two or three drops of these acids may be taken in the patient's usual drink, and deobstruents with mild aperients may be prescribed. It is in this form of the malady that the nitro-hydrochloric acid bath or lotion is the most beneficial; and in it the chlorides, the nitric acid, the tartrate, supertart., and acetate of potass, are also beneficial. In the more chronic and obstinate states of the disease, I have found small doses of the iodide of potassium, conjoined with liquor potassæ and with the decoction and extract of taraxacum, of great service.

199. *b.* When chronic hepatitis is a recent or primary affection, or follows the acute disease owing to neglect or inactive treatment, or when it occurs in persons who live fully or who have not been reduced by previous disease, or by long residence in an unhealthy climate, then local vascular depletions, deobstruent and active purgatives, and mercurials, are especially indicated. If this state of the disease be attended by congestion or enlargement of the organ, local depletions may be freely prescribed, and saline or other purgatives often repeated; but mercurials should, in most forms of chronic hepatitis, be given with caution. They are most beneficial in this particular state of the disease, where, however, they should be employed chiefly as deobstruent purgatives. In other circumstances, experience has not demonstrated their utility, but shown that a frequent recourse to them only perpetuates the mischief, for which they were employed. This seems to be the opinion of CLARK, DICK, SAUNDERS, PEMBERTON, MALCOLMSON, MARTIN, and others; and it accords with my own observation.

200. *c.* The *nitro-hydrochloric acid bath* was first recommended by Dr. HELENUS SCOTT, who afterwards ascertained that sponging the surface with a wash, containing the same acids, was as efficacious as the bath. Since 1796, when Dr. Scott published his first paper upon this subject, Sir JAMES M'GRIGOR, Dr. PEMBERTON, Mr. BELL, Mr. ANNESLEY, Mr. MARTIN, and many others, have shown the great efficacy of this treatment in chronic hepatitis; and, after all the acute symptoms have been removed, in cases of the more active states of the disease. It is more especially beneficial in cases attended by enlargement of the viscus, and a depraved state of the biliary and intestinal secretions. It should be employed daily for some time; and a trial of from two or three to five or six weeks may be given it, according to its effects. Even after its use has been intermitted for some time, its good effects will often continue to appear. In obstinate cases, advantage from it should not be despaired of, although weeks may elapse without benefit being derived from it; and, although the first course of it may have been ineffectual, a second trial may be decidedly beneficial. A short time should elapse between the use of mercurials and a recourse to this bath, or wash[*]; and purgatives should be occasionally given during the course, in order to carry off accumulated secretions from the liver and intestines. If heaviness or drowsiness occur after this treatment has been pursued for a few days, purgatives may be more actively prescribed. During the nitro-hydrochloric course, a change of air, especially to a temperate or cool and pure atmosphere, will be of service. A feeling of cold, however, should not be occasioned by the change, as some risk of aggravating the complaint may be thereby occasioned. Sea voyaging, particularly when medical care may be enjoyed at the same time, is often of service, especially after the patient has resided long in a warm climate. In all cases of change from a warm to a colder temperature, the clothing ought to receive due attention, and the night air should be avoided or guarded against.

201. The *nitrous acid* has been employed, in a very dilute state, as a common drink in chronic hepatic affections, in warm climates, chiefly as an alterative, and in order to promote the secretion and excretion of bile. When taken freely, and continued for a few days, it sometimes occasions salivation; but it is often of service without producing this effect. Sir J. M'GRIGOR considered it equal to mercury in the cure of hepatitis: in the chronic states of the disease it is certainly a safer remedy than mercury, which ought not

---

[*] Mr. ANNESLEY gives the following directions as to the preparation of the nitro-hydrochloric solution, lotion, wash, or bath:—"Into a common quart bottle, put about eight ounces of pure water, to which add four ounces of the nitric acid, and four of the hydrochloric acid, of the strength of the London Pharmacopœia. The '*nitro-hydrochloric solution*' is thus formed. If it is used in the form of a bath, from two to five ounces of it, according to the strength of the patient, is mixed with from two and a half to three gallons of warm water, of 96° or 98°, in a high and narrow vessel, and the feet and legs kept immersed in it for about twenty minutes or half an hour every night before retiring to rest. If the bath does not occasion a pricking or itching sensation in the parts immersed, after twenty minutes have elapsed, the next bath should be increased in strength." Mr. A., however, states that, upon the whole, he prefers sponging the trunk of the body, and particularly the abdomen, with the nitro-hydrochloric lotion or wash; which consists of two or three drachms of the above solution added to a pint of warm water. With this wash, he advises the trunk of the body and the insides of the thighs to be sponged assiduously, for about a quarter of an hour daily, or occasionally night and morning. In torpor, and other chronic affections of the liver, he recommends this wash to be used; also in the form of *fomentation*, or to be aided by the application of warm poultices. "Occasionally much benefit will arise," he observes, "from employing the lotion in the form of fomentation; the water being made as hot as 130° or 140° when the acid solution is added." Flannels soaked with the lotion may be applied for an hour or two every night over the hypochondria and abdomen; and they may be covered with warm poultices, both the moistened cloths and the poultices being renewed from time to time.

to be employed when this acid or the nitro-hydrochloric acids are being used. — *Issues, setons,* or open *blisters,* or even the repeated application of blisters, a little below or over the region of the liver, are often beneficial in the more protracted cases, and when the foregoing means have proved unavailing. After a discharge from them has been established, poultices applied directly over them, and frequently renewed, are sometimes of service. *Vapour baths,* followed by frictions with a coarse towel, or by the flesh-brush, or hair gloves, and *chlorine baths,* are occasionally serviceable, and may be employed in the obstinate cases, in aid of deobstruents, alteratives, and aperients. Of other means notice will be taken in the sequel, and after I have exhibited a view of the more chronic structural lesions of the organ.

202. IV. STRUCTURAL CHANGES IN THE LIVER. —CLASSIF.: — IV. CLASS. I. ORDER (*Author*). These changes are divisible into *two classes,* viz. those which proceed from excited vascular action, or are *inflammatory,* and those which depend upon the state of organic nervous power and nutrition, or are *non-inflammatory.* The former are generally more or less acute or active at their commencement, or are the consequences of acute or sub-acute disease: the latter are always chronic. Although both classes of lesions may originate in alterations of the organic nervous or vital condition of the liver, affecting the circulation and blood, and ultimately the structures of the organ, yet they depend upon very different states of the parts primarily affected; for whilst the one class seems to arise from an excited or exalted state of local nervous power and vascular action, the other apparently proceeds from a depressed as well as depraved condition — from very opposite states of power and of action; although the former may pass into the latter, when neglected, or in circumstances favouring the transition *Congestions* of the organ, which may be independent of, or connected with, either of these classes of lesions — both *vascular* and *biliary congestions* — have already been sufficiently noticed above, (§§ 59, *et seq.*), and need not therefore be again adverted to at this place.

203. i. *Changes more strictly inflammatory, and consequent upon inflammations.* — *A.* The *serous membrane* or covering of the liver is liable to the same changes as are observed in other serous membranes. These are chiefly distension or development of the capillary vessels, effusion of lymph from the free surface of the part, and adhesion by means of this lymph to contiguous surfaces. The lymph thrown out upon the inflamed surface generally excites inflammatory irritation in the opposite surface, when brought in contact with it; and new capillary vessels are developed from the meshes of the old, and shoot into the coagulable lymph and organise it. The membrane itself becomes slightly thickened, softened, and less tenacious than natural. These changes are common on the convex surface of the organ, are less frequent upon the concave surface, and are generally observed after acute or sub-acute hepatitis affecting chiefly the surface of the organ, or membranous hepatitis. In these cases, congestion of the substance of the liver, and sometimes inflammatory appearances of the part subjacent to that chiefly affected, are also observed. In old or chronic cases, the serous membrane is often thickened, opaque, and dense. It is sometimes also more readily torn, or less resistent. Depositions are also formed underneath this membrane, in the chronic forms of inflammation of it. They consist of thin plates, presenting a cartilaginous appearance, and of an atheromatous substance.

204. *B. The substance or parenchyma of the liver,* (*a.*) when *inflamed,* is more or less reddened, often deeply red, congested, and softened. If the inflammation is general, there is also great tumefaction from vascular distension. It is seldom, however, that the earlier changes connected with acute or chronic inflammation of the liver are observed, as the consequences and complications of the disease chiefly cause death. These early changes may occur in a part of, or more or less extensively throughout, the organ. They may exist alone, or be associated with inflammatory appearances in the serous surface, or with more advanced or other lesions.

205. (*b.*) *Softening of the structure* of the organ is various in degree, and is commonly caused by the more acute states of inflammation, although it may also proceed from other causes. When produced by inflammation there is not only friability but also redness more or less deep. In some places the redness is lessened by a sero-puriform or a puriform infiltration between the minute lobules. In these, abscess would most likely have been more fully developed, had the patient lived longer. In other cases the softening has proceeded still further in the centre, or in various parts of the inflamed tissue. In some instances, particularly in warm climates, the softened part is of a deep or dark colour, owing to associated vascular and biliary congestion (see CONGESTION OF, § 73.). The most remarkable grade of softening is that which is sometimes observed after death from the more adynamic or malignant forms of remittent or marsh fever, and from scurvy. In these the softening is not the result of inflammation, but of depressed vital power, causing extreme congestion with alteration of the congested blood. The congestion is sometimes so great in these cases, the blood so dark, and the tissues of the organ so softened or so much deprived of its vital cohesion, that the viscus assumes the appearance of a black, friable, or pulpy mass, which readily breaks when it is handled. Softening of the liver is often conjoined with tumefaction or enlargement, although not necessarily. Dr. BAILLIE has noticed softening of this organ in aged persons, the consistence of it approaching that of the spleen, and its colour being of a brownish red. Still more extreme states of softening have been observed by PORTAL, BALLY, JACKSON, DEVÉZE, MONTFALCON, BAILLY, myself, and many others, in fatal cases of malignant remittent and other fevers, of scurvy, and of purpura. In these the organ had hardly retained its form by means of the cellular framework of GLISSON's capsule and of its vessels.

206. (*c.*) *Suppuration and abscess* often follow softening of a portion or parts of the substance of the liver. Indeed, the softening may generally be viewed as the antecedent of suppuration, the sero-puriform matter effused from the capillaries of the part breaking down or dissolving the vital cohesion of it, especially at its centre. If the

constitutional powers be not sunk, and if the blood be not contaminated, lymph is effused around the central softened and infiltrated part, and this lymph, as the infiltration and effusion in the centre proceeds, forms a cyst inclosing the matter secreted from its internal surface. (See art. ABSCESS, §§ 5, *et seq.*). If, however, the powers of life and state of the circulating fluids are such as not to form coagulable lymph, which may be thus condensed and stretched into a cyst by the matter accumulating within it, the abscess assumes a *diffuse* character, is not surrounded by any distinct cyst, the purulent matter at the margins of the collection infiltrating the surrounding lobules or structure of the organ. (See art. ABSCESS, §§ 13, *et seq.*)

207. *Abscess* of the liver may hence be divided into the *encysted* and *non-encysted*, either of which may be large and single, or numerous and small; or one large and several small may exist in the same organ; but it is very rare to find both the encysted and non-encysted in the same viscus. Abscesses frequently proceed from acute, and less frequently from chronic inflammation. They are much more frequently consequences of chronic or subacute inflammation in scrofulous persons. — *α*. Abscess, particularly when single and contained in a cyst, often attains a very great size, and converts the whole of the right lobe into a vast sac, stretching and condensing, and ultimately atrophying or destroying, the lobular structure of the organ around it, rising high in the right thorax, and bulging the hepatic regions. The cyst may be thin or thick, or more or less manifestly organised, and capable of containing from a few ounces to several pints. LOUIS and ANDRAL consider that the internal surface of the cyst is analogous to mucous membrane.

208. *β*. The *non-encysted* kinds of abscess are rarely very large, although I have seen them very large in one case, and others have been observed by Mr ANNESLEY. They are rarely single, several or even many existing in the same case. They are either in immediate contact with the structure of the organ or partially infiltrating or diffused among the surrounding lobules. In many of these cases, little or no inflammatory appearances exist in the adjoining substance of the organ, whilst in others these appearances are either slight or equivocal, or are merely those of congestion. These abscesses are owing chiefly to phlebitis, or to the passage of puriform matter into the portal circulation, that is either deposited in the part, or excites inflammation in the minute capillaries of the secreting structure. They have been also attributed, as noticed above (§§ 20. 152, 153.), to inflammatory action propagated along the hepatic ducts, according to some; and along the mesenteric and portal veins from the intestines, according to others.

209. The researches of M. CRUVEILHIER (*Nouv. Biblioth. Med.* t. iv. *et Anat. Pathol.* liv. xi.), however, have thrown much light upon the formation of these abscesses, which I have denominated *consecutive* or *secondary* (See art. ABSCESS, § 27.). He ascertained that abscess of the liver from injuries, fractures, wounds, and surgical operations, is always preceded or accompanied by purulent collections in the lungs, and always results from the same cause, namely, from capillary phlebitis in the neighbourhood of the injury or wound; the globules of pus, which thus pass into the circulation, occasioning inflammatory irritation in the capillaries of these organs in which the secondary suppuration is developed. When purulent or other morbid secretions are carried into the general circulation, the lungs, and frequently also the liver, become the seat of secondary abscesses, particularly when the powers of life are reduced, and the morbid matter is not excreted by the active functions of depurating organs. When these secretions pass into the blood of the portal system, consecutive abscesses or purulent collections generally take place in the liver. Hence, when ulceration occurs in the follicles or mucous surface of the bowels, in chronic diarrhœa and dysentery, capillary phlebitis in the vicinity of the ulcerated parts sometimes supervenes, and the pus being carried into the portal circulation, excites inflammatory action of the capillaries of various parts of the liver. In like manner, secondary abscesses in the liver follow, as noticed above (§ 20.), operations for hæmorrhoids, fistula in ano, abscess, or ulceration near the anus, uterus, &c.

210. The changes which take place in the liver in these cases are stated by M. CRUVEILHIER to be, in the first instance, effusion of bloody lymph and induration around the consecutively inflamed capillary vein; secondly, a secretion of yellow concrete pus into the minute veins, and among the lobules, giving the part a granite-like appearance; and thirdly, collections of pus, or small abscesses lodged in irregular cells, which increase in size by the continued secretion and extension into other cells. These purulent collections are surrounded by a narrow congested circle or margin, imparting to them a peculiar character. After they have existed a considerable time, their watery parts are absorbed, leaving concrete, whitish, and cheese-like masses, often resembling the matter of scrofulous tubercles.

211. (*d.*) *Gangrene* of the liver has been very rarely observed; and then chiefly in connection with *non-encysted* or *diffuse abscess*. I have seen only one instance of it; and it has likewise been noticed by FORESTUS, STEIDELE, Dr. CARSEWELL, and Mr. ANNESLEY.

212. (*e*) *Enlargement or hypertrophy of the liver* is commonly consequent upon chronic inflammation, or upon the acute, after it has lapsed into the chronic state. It may be independent of any existing inflammation, and of vascular or biliary congestion, although either or all of these, in some grade or other, may have preceded, or may accompany it. The enlargement may be partial, or limited to any part or lobe of the organ, or it may be general. Mr. E. WILSON considers that it arises from irritation of the mucous membrane of the ducts, occasioning, in the first instance, retarded circulation and venous congestion; or from impediment either in the circulation through the heart, or through the rest of the venous system; or again from impairment of the general powers of the system, as in the scrofulous constitution. Without, however, disputing these sources of the lesion in some cases, I believe that it as frequently proceeds from an exudation of lymph between the minute lobules, or in the distributions of GLISSON'S capsule, that becomes more fine and dense, or more organised, the longer the period which has elapsed from its effusion; and that this lymph is the result of a sub-acute or chronic state of in-

flammatory action. Mr. E. Wilson states that the lobules are always in a state of partial congestion, resembling the second stage of hepatic venous congestion (§ 67.); the congested portion presents a deep red tint, and the uncongested part is ramose or convoluted in appearance, of a dirty white, greyish, yellowish, or greenish hue, according to the condition of the biliary ducts and apparatus, and to the quantity and colour of the bile contained in the liver. Sometimes the organ is pale, and seems deficient in blood; at other times it has a generally diffused redness, or the congestion may be greater in one part than in others. The *consistence* of an enlarged liver is equally variable with its colour: sometimes it is harder, firmer, or denser than common, and even apparently granulated; the uncongested and granulated or denser parts projecting occasionally above the surface, and the congested portion sinking below the level of the former. As frequently, however, the organ is more or less softened, although often partially or unequally so. The enlargement of the liver may take place to a very great extent, the organ weighing twenty, thirty, or even forty pounds; its enormous bulk displacing more or less the other abdominal viscera. Hypertrophy is often associated with lesions of other organs, particularly of the lungs, spleen, mesenteric glands, pancreas, &c.; and with other maladies, as scrofula, rickets, dropsical effusions, &c.

213. (*f*) *Induration* is occasionally attendant upon enlargement, and also upon atrophy, of the substance of the liver; but it sometimes is met with independently of these alterations, or with a normal size of the organ; the colour of the indurated portion varying with the grade of vascular or biliary congestion, from yellow to green, brown, or brownish red. The degree of density varies from a somewhat firmer state of the structure up to a cartilaginous condition. The highest grade of induration is generally observed in cases of atrophy. Occasionally the induration occurs in parts only of the organ, or is greater in some portions than in others. In rare instances it presents the distinct character of a fibrous or fibro-cartilaginous cicatrix, formed after the adhesion of the opposite sides of an abscess, the contents of which had been absorbed. The most hardened and granulated-like parts are also most deficient of blood.

214. (*g*) *Atrophy* of the substance of the liver is, like induration, one of the more remote consequences of inflammatory action. It may succeed congestion, or even hypertrophy; and, as shown by Portal, is a much more rare occurrence than enlargement. As the viscus diminishes in bulk, the lobules become indistinct and variously congested, and appear intermingled and pressed upon by the cellular tissue with which they are surrounded. Mr. E. Wilson says that the proper lobular structure is sometimes entirely removed, and replaced by a loose or condensed cellular tissue. At other times the entire substance of the organ appears to have been absorbed by the pressure of a very large abscess, which has discharged its contents into the intestinal canal, and the parietes have afterwards contracted into an atrophied mass. In rare cases, the atrophy is connected with a complete or incomplete cicatrix, remaining after *absorption* of the contents of an abscess, as noticed above (§ 213.). These cases have been detected chiefly in India. Lieutaud found a liver that was shrivelled into a mass not larger than his closed hand. Portal met with this viscus in a case of ascites, not larger than an ordinarily sized apple. Atrophy of the liver may be *general* or *partial*. The latter, conjoined with hepatic venous congestion, is not an infrequent consequence of the practice of tight lacing, as Mr. E. Wilson has justly observed. The surface of the liver, in some of these cases, is marked by deep fissures into irregular polygonal divisions, resembling the lobulated appearance of the fœtal kidney.

215. The *Cirrhosis* of Laennec is the most important form of atrophy of the liver. In it the organ is diminished to one half, or even one third, of its natural bulk; the relative size of the right and left lobes is destroyed; and the surface is rendered shapeless by the projection of a number of ridges or granular points. The entire organ is wrinkled and shrivelled, is of a yellowish or greenish colour, varying from a bright yellow to a yellowish or greenish brown. Upon dividing its substance, it is found denser than natural; and the divided surface presents a number of patches of various sizes, but of a roundish form, resembling granules; and hence this state has been denominated granular by French writers. This alteration has been variously described by Laennec, Bouillaud, Andral, and Cruveilhier. Mr. E. Wilson remarks that Mr. Kiernan first distinguished the true nature of cirrhosis, which he called atrophy of the liver. In a case of granulated cirrhosis, the liver being diminished to one half its natural size, Mr. Kiernan discovered, on injecting it, "that a collateral venous circulation had been established by way of the diaphragm." In another case of a woman who had been tapped ninety times, he found, upon injecting the liver, that the same kind of collateral venous circulation had been formed. "The circulation through the liver had been impeded by the development of condensed cellular tissue; and the greater part of the blood of the portal vein had made its way through dilated vessels upon the surface of the organ to the diaphragm, and from thence into the general venous circulation. In the latter case there were numerous bands of adhesion between the liver and diaphragm, and between the intestines and the walls of the abdomen, and these also were traversed by large veins conveying blood from the portal vein into the general venous current."

216. M. Laennec believed that the mottled and granular appearance of a section of the liver in a state of cirrhosis arose from a morbid deposit, or from a special accidental tissue existing in the two states of crudity and softening. But somewhat more correct views were successively formed by Bouillaud, Andral, and Cruveilhier, until Mr. Kiernan demonstrated that cirrhosis is a partial atrophy of the liver — atrophy of the lobules with hypertrophy of the cellular tissue; complete atrophy of some of the lobules, partial atrophy of others, and biliary congestion without atrophy or hypertrophy of the rest. The small yellow grains, varying in size from a millet seed to a pea or hazel nut, are not distinct lobules, in a variable state of hypertrophy, but small uncongested patches, composed of parts of several ad-

joining lobules, and having a single or several interlobular spaces for a centre.

217. Cirrhosis may follow enlargement of the organ; and it is manifestly the more remote consequence of chronic inflammatory action or irritation, during which the coagulable lymph exuded into the cellular tissue connecting the lobules becomes organised, adds to the bulk and density of the cellular element of the organ, and thus hypertrophies it; the pressure thereby occasioned, together with imperfect nutrition of the lobules, producing more or less complete atrophy of them; whilst the varying states of vascular and biliary congestion, or of deficiency of blood and of bile in the vessels and ducts, occasion various tints of colour in different parts of the organ. When this lesion is far advanced, it produces ascites and jaundice, generally of that kind which proceeds from the accumulation of the elements of bile in the circulation. It is also sometimes preceded and attended by disease of the lungs or heart.

218. ii. *The second class of Lesions of the Liver, or those which seem more especially to depend upon impaired vital power and depravation of the blood sent to the organ*, differ from the foregoing in presenting no inflammatory character; in depending chiefly upon a constitutional vice, or proceeding from a diseased disposition inherent in the system; and in consisting chiefly of morbid deposits, and of malignant formations. As most of these have separate articles devoted to the consideration of their nature and treatment, a brief notice will therefore be taken of them as they appear in the liver.

219. *A. A deposit of fatty or oily matter* is not infrequently observed throughout the liver. A certain portion of oily or fatty matter is one of the chemical constituents of the liver; but this may be so greatly increased, appearing in different forms, in the substance of the organ, as to constitute more than one half of its weight. M. VAUQUELIN analysed a fatty liver which furnished 45 parts of oil out of 100 parts of the organ. This lesion is characterised by appearances resembling those exhibited by the livers of those fishes which furnish a large quantity of oil. The organ is of a cream or pale yellow colour, sometimes presenting deep orange or brownish spots on the surface. Internally its appearance is nearly the same as that of its surface. It is generally enlarged, and sometimes softened; but it is occasionally firmer or much harder than natural. The fatty matter is commonly distributed equally through its structure, or infiltrated in the connecting cellular tissue. Sometimes, however, it is deposited in a mass, or forms several collections in various parts of the organ. This change is readily recognised by the greasy feeling it occasions. A section of it appears like that of yellow soap. "The vessels seem pressed upon, and are scarcely perceptible; and the greasy deposit is divided into angular masses by a coarse and compressed cellular tissue." (E. WILSON.) The quantity of fat deposited in the organ is sometimes very great, and it may exist even in a fluid state.

220. PORTAL found the liver quite white, and softened almost to the fluidity of melted fat, where no hepatic symptoms existed during life. He also met with this state of the organ in a female suffering a severe form of syphilis. Fatty deposit in the liver is similar to other morbid deposits. The fat is not owing to a degeneration of the structure of the organ, but to an undue secretion or deposit of the oily substance into the cellular connecting tissue of the organ, whereby its vessels and lobules are pressed upon, atrophied, or removed, in proportion to the amount of deposit. This lesion is found most frequently in persons who have died of scrofulous tubercles in the lungs, and of cancerous maladies. It has also been observed in connection with hepatic and various chronic eruptions on the skin.

221. ANDRAL thinks that it may be owing to insufficient arterialisation of the blood in the lungs, and diminished pulmonary exhalation; and he inquires, if it can arise from an imperfect separation of hydrogen from the lungs, this element combining with the other element of fat, and being deposited in the parenchyma of the liver? This is not improbable, particularly during the low grades of vital power in which this change occurs, and in which nutrition is imperfectly accomplished.

222. *B. Deposits of true Tubercle* in the liver is rarely observed, and still more rarely independently of the presence of similar formations in the lungs, or other organs; or of general indications of the scrofulous diathesis. They are met with in the liver of various sizes, from that of a millet seed to that of a hazel nut. The tubercles are of a soft cheesy consistence, and have a tendency to a brownish tint. They are deposited or infiltrated, according to Mr. E. WILSON, in the tissue of the lobules, which are compressed and congested by them. The obstruction to the circulation in the organ occasioned by them gives rise to more or less congestion.

223. *C. Scirrhus, Carcinoma, or Cancer of the Liver*, appears in several forms; but most frequently in that of tubercles, tumours, or tubera of different size and consistence. They generally accompany manifestations of the malady in other parts of the body. At the commencement of their development in the liver, they resemble small, whitish, semi-opaque patches, occupying the tissue of one or several of the lobules. As they increase in size they put on different appearances, and hence they have been divided into species and varieties. — (*a*) The simplest of these has been termed *scirrhous tubercle*, and is well described by Mr. E. WILSON. It commences in a semi-opaque patch, and the outline of the lobules is for some time distinctly perceptible through its area; but at a later period the centre of the patch becomes quite opaque, and presents a cartilaginous hardness. The circumference is gradually diffused in the surrounding textures; and the progressive increase of the tumour seems to take place by the secretion of a milky albuminous fluid into the meshes of the lobular venous plexuses. As this secretion increases and becomes more consistent, the circulation in these plexuses is arrested, and the vessels obliterated. The obliterated vessels, according to Mr. WILSON, give rise to the appearance of small cells, in which the carcinomatous matter is deposited, and the larger areæ are produced by the tissue of the capsules of the lobules variously distorted from their original form by the increased deposition. As the tumours become larger, white lines, formed by compressed cellular tissue, radiate from the centre to the circumference. Upon the surface of the liver, the

scirrhous tubercle appears flat, or slightly depressed in the centre.

224. (*b*) In a *second variety*, these carcinomatoustubercles, or tubera, are small and numerous, of a yellowish or brownish colour, and more rapid in their growth than those just described. The cells in which the carcinomatous matter is contained seem thicker, of larger size, and the contained matter or secretion is less firm than in the above variety. Occasionally they are reddened in the centres by an effusion of blood, or by the congestion of unobliterated vessels, or by the passage of large or dilated nutritious vessels. When the latter variety of carcinomatous tubercles enlarge, they often coalesce, forming an irregular compound mass, divided into compartments, marking its original multiple form by septa of condensed GLISSON's capsule supporting dilated vessels. This form of tubercle or tumour appears to be identical with the first variety of the *tubera diffusa* of Dr. FARRE, and which he states to be "elevated at the surface of the organ, but not uniform in their figure, some rising with a regular swell into a round form, others acquiring a margin, by being gradually depressed towards the centre, forming tumours without cysts, almost pulpy in their consistence, cellular in their structure, and containing an opaque white fluid."

225. (*c*) A *third variety* of the albuminous carcinomatous tumours, the "large white tubercle" of BAILLIE, the "tubera circumscripta" of Dr. FARRE, is well described by the latter physician. These tumours are of a yellowish white colour, and their projecting surfaces, slightly variegated with red vessels, deviate from a regular swell by a peculiar indentation at or near their centres, which are perfectly white and opaque. They vary much in size, according to their age or duration; for each tuber at its commencement is very minute, but during its growth it assumes the above character, and at its maturity exceeds an inch in diameter. These tumours commonly are distinct at the surface of the liver; but they coalesce internally, and form immense masses pervading the substance of the organ. Their cellular structure is so close, that a section of them appears solid and inorganic; but a white fluid of the consistence of cream is left on the knife by which they are divided, and a fresh portion of this fluid adheres to it each time that it is passed over the surface of the section. The cellular structure becomes more apparent after long maceration.

226. (*d*) A *fourth variety* of carcinomatous tumour has been named the *gelatiniform cancer*, from the firm and jelly-like deposit occupying the cells of the tumour, instead of the albuminous secretion in the preceding varieties. The liver may contain a considerable number of tumours of various sizes dispersed through its substance. The smallest resemble the small patches in the incipient stage of the other forms of carcinoma already noticed. The largest are equal to a walnut in size. They are distinctly circumscribed, and the lobules immediately surrounding them are flattened and compressed. In the smaller tumours the form of the lobules is more or less distinct; but, in the larger, the lobules have yielded to the characters of the disease. On the surface, the centre of the tumour presents an oval or circularly indented ring, around which it swells abruptly, and then subsides to the circumference. In a section of one of the larger tumours Mr. E. WILSON found a central area about two lines in diameter, transparent, dense, gelatinous, and bounded by a white marginal line. The portion of the section surrounding the central area formed the bulk of the tumour, was elastic, and rose above the central area, subsiding gradually to the marginal line and circumference. The whole section bore a striking resemblance to the conjunctiva affected with chemosis, only that it was paler. On examining a thin section with a lens a number of minute parallel injected capillaries were seen traversing the marginal portion of the tumour towards the white boundary line of the area, but no vessels could be traced through that line into this area.

227. (*e*) *Medullary sarcoma* is a *fifth form* of malignant disease occasionally found in the liver — the *encephalosis* of several writers. The tumours produced by this morbid deposit are larger than scrofulous tubercles; and fewer, and more regular in form, than the scirrhous variety (§ 223.). They are originally developed in the same way as scirrhus, by infiltration into the minute capillaries, or into the tissue of the lobules, of a greyish white and opaque substance, which, as it accumulates, obstructs the circulation in the surrounding lobules. In their advanced state, the internal structure of these tumours consists of a loose cellular base filled with a soft and brain-like matter, often coloured with blood, or containing coagula from extravasation, in various stages of softening. As they increase in size, they become softer and more pulpy. This variety of malignant tumour seems to be identical with the second and third varieties of the "*tubera diffusa*" of Dr. FARRE.

228. (*f*) *Fungus hæmatodes*, or the *fungo-hæmatoid* tumour, is a *sixth form* of malignant disease met with in the liver, and is very intimately allied to the variety last described. In it there is a much more remarkable disposition to the development of new vessels, and to extravasation of blood, than in any of the preceding. As Mr. WILSON remarks, hard, cartilaginous, and scirrhous tumours may exist with those of a softer texture, and of a medullary form; and both of these may be mingled together in the soft, elastic, and bleeding mass, constituting fungus hæmatodes. Fungo-hæmatoid tumours are often of a large size, and give rise to severe symptoms, or to speedy death, by their frequent or copious hæmorrhages. They constitute the fourth variety of "*tubera diffusa*" of Dr. FARRE; and have been fully described in the article on Fungo-hæmatoid disease.

229. M. CRUVEILHIER considers the venous capillary system to be the seat of all these varieties of malignant disease, more particularly of the fifth variety. He states that he found the ramifications of the vena porta filled with the peculiar matter constituting the principal part of the malignant tumour, and that it adhered to the parietes of the vessels, which became in consequence greatly dilated. The alteration was confined to the ramifications of the portal vein, the hepatic veins and their distributions were completely sound. — (*Anat. Patholog.* liv. xii.)

230. *D. Melanosis* exists in the liver, in either of the following forms: — 1st. As a secretion infiltrating the cellular structure of the organ, and giving a general blackness to the substance of the

lobules: — 2d. As a morbid mass, composed of an areolar cellular net-work, in which the black carbonaceous matter is deposited: — 3d. As a melanic pigment accompanying tubercle or carcinomatous tumours, and imbuing the morbid structure with its colour. Melanosis varies in shade from a deep chocolate brown to a rich black. It rarely, or perhaps never, exists in the liver, without being met with in other organs, or parts of the body. (See art. MELANOSIS.)

231. *E. Simple cerous cysts* are sometimes found in the liver, and are mistaken for hydatids. These cysts contain a watery fluid; their inner surface is similar to that of serous membranes; and their external surface is either adherent to the part in which they are embedded, or is surrounded by condensed cellular substance. These cysts are altogether different from the fibrous cysts, which contain within themselves a number of detached smaller cysts or vesicles, and which are next to be noticed.

232. *F. Hydatids* or *Acephalocysts* are frequently found in the liver, inclosed in a fibrous cyst, and contained in a single parent hydatid vesicle. The hydatid cyst generally occupies the right lobe of the liver, and is most frequently situated very near the surface. It increases to a very great size, causing absorption of the structure of the organ, and opening into other viscera, after adhesions have been formed between them and the external cyst. Hydatids present the same characters in this organ as in other viscera. (See art. HYDATIDS.) When they are numerous, or when the cyst reaches a great size, a tumour is perceived or detected by touch in the region of the liver. The tumour is generally without a hardened base, circumscribed, soft, and yielding; is unaccompanied by the symptoms indicative of abscess; has not been preceded by indications of acute or sub-acute hepatitis; and is not attended by the constitutional evidences of cancerous disease. The external cyst is sometimes hardened by deposits of cartilaginous or bony plates. The enveloping cyst may open: — 1st. Externally through the abdominal parietes: — 2d. Into the cavity of the peritoneum. — 3d. Into some part of the alimentary canal, particularly the stomach and colon: — 4th. Through the diaphragm into the pleural cavity; — and 5th. Into the bronchi, whence the small hydatids may be expectorated. Some small cysts have occasionally been found in the liver containing a calcareous deposit, mingled with a membranous substance resembling fragments of hydatidic sacs. These cysts are supposed to result from the spontaneous cure of hydatids.

233. *G. Intestinal worms* have, in rare instances, been found in the hepatic ducts, having passed from the duodenum along the common duct. It is very probable, however, that the worms have passed into the ducts after the death of the patient.

234. iii. DIAGNOSIS OF ORGANIC LESIONS OF THE LIVER. — The symptoms of most of the structural changes of the liver are very equivocal, as many of them are common to several of these changes, as well as to certain states of functional and acute diseases of the organ. I shall therefore endeavour to determine the dependence which may be placed upon each of these symptoms or signs, in estimating the seat and nature of the malady which occasions them.

235. *A. Pain* or *uneasiness* in any part of the region of the liver may arise not only from disease of this viscus, but also from diaphragmatic or costal pleuritis, or from partial peritonitis in the vicinity of the organ; from disease of the pylorus or duodenum, or of the pancreas; from flatulence affecting the duodenum or the right arch of the colon; from fæculent accumulations in the colon; or from disease of the substance or pelvis of the right kidney. Pain in its most severe states has been attributed above (§ 62.), either to neuralgia of the nerves supplying, or connected with, the liver, or to the irritation of gall-stones in the biliary passages. It should, moreover, be recollected that, during the progress of structural changes of the liver, little or no pain, or merely uneasiness, may be felt in it, whilst symptomatic pains may exist in distant parts, chiefly however of the right side; the organic lesion not materially disturbing the sensibility of the nerves of the organ themselves, but exciting, through their medium, the sensibility of some portion of the spinal nerves of sensation. Next to the pain occasioned by gall-stones, neuralgia, and acute inflammation, that produced by malignant disease of the liver is the most severe. Hydatids, fatty deposits, hypertrophy, cirrhosis, granulations, indurations, and small secondary abscesses, are attended by little or no pain, especially in the hepatic region. The pain varies as respects its seat and extent. It may be *limited* to a particular point, or *diffused* over the whole hepatic region, affecting not only the right hypochondrium, but also the epigastrium, the back, the lower part of the right thorax, the right shoulder or apex, the left hypochondrium, &c. When it is limited, it may be seated in either of these parts, or it may change from one to another. It varies also in severity and in its character, as well as in its continuance. It is commonly more severe at one time than at another; or it presents exacerbations and remissions, or even complete intermissions. It may be felt only upon pressure, or in certain postures or positions. It is impossible to state any relation between the nature of the malady and the character of the pain or altered sensibility caused by it, as no such relation has been duly observed, or even perhaps exists. It is chiefly, however, in the more acute inflammations, particularly when seated in, or extending to, the surfaces of the organ, that pain is most continued as long as the inflammation is unsubdued. In all the other lesions, unless, perhaps, the sarcomatous form of carcinoma, the pain is remittent or intermittent, or developed only by pressure or by position.

236. *B. Swelling* or *tumour* has been already noticed, especially with reference to *abscess* (§ 140.), *hydatids* (§ 132.). In order to ascertain the existence of either, the patient should be carefully examined in the manner above described (§ 99.). He should also be examined whilst standing up, leaning forwards with his hands upon the back of a chair. The abdominal muscles will thus be released, and the liver will fall more anteriorly. The changes with which enlargement or tumour of the liver is most to be confounded are, distended gall-bladder and tumours connected with other organs, as the pylorus, the pancreas, the duodenum, the omentum or stomach. I have already shown (§ 145.)

how effusion into the right pleural cavity may so displace the liver as to occasion swelling or tumour beneath the ribs, from protrusion of the edge of the organ. Tumours, in the adjoining viscera just named, are often with great difficulty distinguished from those of the liver, whilst these latter are very readily mistaken for the former. Those which are situated in the hepatic region, or which are thus doubtful as to their seat and connection, have been divided into two kinds, as they seem to contain solid or fluid matter. This distinction, however, is not very easily made, especially when they are deep-seated, or when the patient is corpulent.

237. *a. Tumours containing fluid matters* are generally more or less *fluctuating;* but cases occasionally occur in which the fluctuation cannot be detected; as in a case about to be noticed. Fluctuating tumours are chiefly hepatic abscess, hydatid or serous cysts, and distended gall-bladder.—1st. *Tumour caused by Hepatic abscess,* as shown more fully above (§ 140.), is at first hard and diffused. Fluctuation is afterwards detected with great difficulty; appears gradually, and only in the centre, extending to the circumference, as it increases; the more prominent and fluctuating part being surrounded by swelling and hardness. 2d. *Hydatidic,* or *serous cysts* (§§ 231, 232.), give rise, in most cases, to a circumscribed tumour, more less fluctuating, elastic; but little or not at all painful, and unattended by diffused swelling or hardness at its base, or by redness of the surface, unless the cyst has reached the integuments, or has occasioned inflammation of the surrounding tissues.* 3d. *Distension of the gall-bladder* has been described in the article on the diseases of the GALL-BLADDER AND DUCTS; and the *diagnosis* between it and hepatic abscess fully stated (see § 22.).

238. *b. Solid tumours,* in or near the hepatic region, generally are connected with the liver, when they partially extend under the cartilages, and when they retain nearly the same position. Tumours of the omentum, stomach, or pylorus, generally admit of more or less motion. The swelling caused by congestion, or by inflammation, or hypertrophy, of the organ, is smooth and diffused. The enlargement or tumours produced by cancerous deposits, when attended by inequalities of the surface of the organ, sometimes may be distinguished by these characters, which may be evinced through the abdominal parietes when the patient is emaciated, and when the liver falls below the ribs. The celerity or slowness of the development of the enlargement or tumour will also assist the diagnosis: enlargements produced by congestions both appear and disappear the most rapidly, whilst those caused by hypertrophy and malignant deposits are the most slow and permanent.

239. *C. Jaundice* has been so fully considered, in the article devoted to that subject, especially in respect of its pathological relations, that no further notice need be taken of it as a symptom of hepatic diseases. Intimately connected with this state of the cutaneous surface, is the *appearance of the alvine evacuations.* Generally when there is jaundice, the stools are more or less pale; and, when organic lesions of the liver are attended by this state of the skin, the evacuations are often of a light drab colour, approaching to white. But in chronic alterations of the organ, unattended by jaundice, the motions are very irregular, both as to frequency, consistency, and colour: they are often very unequal or very different in colour — even the same evacuation exhibiting a great variety of colour, owing to the unequal discharge, and admixture of the bile in the stools. They are generally pale, offensive; often yeasty, whitish or clayey; and very rarely natural either as to odour or appearance. In the more chronic cases, discharges of blood, of varying quantity, are observed in the motions.

240. *D.* The *urine* presents appearances connected with the nature of the hepatic disease, and with the degree of obstruction to the secretion and excretion of bile. In some cases it assumes a deep yellow hue before the skin itself becomes discoloured; and it often deposits lithate of ammonia, of a bright pink colour, on cooling. In most cases where the structural change has existed for some time, or is extensive, and the jaundice is deep, the urine is as dark as porter, and is often also of a greenish tint. It is often also scanty and turbid, especially when dropsical effusions, particularly into the peritoneum, have taken place.

241. *E. Dropsical effusion* is a frequent attendant on far advanced structural lesions of the liver, and generally commences in the abdominal cavity, extending to the lower extremities only after the ascites has made considerable progress. When dropsy proceeds from disease of the heart, it generally observes an opposite course, the effusion commencing in the extremities, and afterwards extending to the large cavities. Cirrhosis or atrophy of the liver, induration, and the forms of degeneration which implicate the principal part of the substance of the organ, and impede or arrest the circulation of the portal system, always sooner or later are followed by dropsy. Indeed the abdominal effusion may be the first, and even the chief, indication of the hepatic malady. (See art. DROPSY, § 90. 96.)

242. *F. Hæmorrhages,* as has been shown in the article upon this subject, often attend the more chronic and extensive organic changes of the liver. This circumstance has been fully insisted upon by practical writers; and the same resistance placed in the way of the portal circulation, which, in one class of persons, is followed by ascites, in another class is productive of hæmatemesis, hæmorrhoids, intestinal hæmorrhage, or epistaxis;—in the one, serous effusion takes place from the peritoneal

---

* A fibrous cyst or sac containing fluid or grumous blood was said to have been found connected with the liver in the case of a lady whom I saw in consultation with my friend Dr. BAIRD. She was advanced in age, was corpulent, and had been more corpulent than she was then. A large tumour was detected in the abdomen; it changed its position more or less with the change of posture, and often fell below the umbilicus. It seemed firm, and it evinced no fluctuation. Its mobility, situation, size, and hardness, induced Dr. BAIRD and myself to view it as a cartilaginous or solid tumour developed in the omentum. The patient complained of various gastric symptoms, but of little or no pain, until shortly before I saw her, and then the pain was referable chiefly to the irritation produced by the tumour in the peritoneal surface of the bowels, and other viscera with which it came in contact. This lady accompanied her husband to Malta, whither he proceeded to pass the winter; and there she died soon afterwards. The body was opened by the medical man who attended her there; but the account of the inspection furnished by him was so imperfect, as to contain nothing more than that a large fibrous tumour was found connected with the anterior edge of the liver, and contained grumous blood.

surface, in the other sanguineous effusion occurs from the digestive mucous surface, the tendency to either the one or the other depending much upon the vital condition of the membranes, in connection with the state of the blood itself, and the condition of the viscus, from which the hæmorrhage proceeds. Hæmorrhage also, like dropsy, may be contingent upon the hepatic lesion either before jaundice has appeared, or at any period subsequently, but most frequently after some degree of discolouration has at one time or other occurred. Occasionally jaundice has been present and entirely removed, and at some period more or less remote from its removal hæmorrhage from some part of the intestinal canal has taken place, proved critical for a time, or has recurred from time to time, or even been excessive. In some cases, particularly when it occurred at an advanced stage of the hepatic disease, and after jaundice has been deep, it has been very abundant, and has hastened a fatal termination.

243. *G. Cough* frequently attends enlargement of the liver, as well as acute, sub-acute, and chronic inflammations of the convex surface of the organ. It is most frequently observed when adhesions have been formed between the part of the viscus and the diaphragm, and when the enlargement has been so great as to drag the latter downwards, or to irritate the respiratory nerves.

244. Besides the above, various other symptoms attend chronic lesions of the liver, and which, although not constantly present, are still very frequently observed, and deserve attention and due estimation. Of these the most common are, emaciation, sallowness or pallor of the countenance, or a sickly appearance of the face and eyes; flatulence, and acrid or rancid eructations, irritating the pharynx; slight acceleration of the pulse towards evening, heat and dryness of the palms of the hands, drowsiness, or pain, or heaviness over the eyes. Occasionally a fissured or lobulated appearance of the tongue, which is sometimes also smooth and glossy, or loaded and foul, or more rarely furred in the middle and root, is observed. An irregular or partial perspiration often breaks out, and is frequently greasy and offensive, especially at night, or when it is copious. The existence of malignant formations in the liver may occasionally be inferred from the state of the stools and urine, in connection with the general cachexia and anæmia attendant on the advanced stages of those maladies, and sometimes with manifestations of them in most external or superficial parts; but much uncertainty always attends their diagnosis.

245. iv. TREATMENT OF THE STRUCTURAL LESIONS OF THE LIVER.—It is obvious that the treatment of these lesions must necessarily be a matter of difficulty and uncertainty, inasmuch as most of them cannot be ascertained with any degree of precision during the life of the patient. It is chiefly in cases of enlargement of the organ that admits of recognition, or of serous or hydatidic cysts of considerable size, that means of cure can be appropriately or successfully employed. When fluid, semi-fluid, or solid matters are deposited in the liver, so as to enlarge or obstruct it, a reasonable expectation may be entertained of removing them, by the aid either of medicine or of diet and regimen. Hitherto, however, the means which have been considered most suitable for this purpose have not been such as could admit of a very successful application. Whatever means may be had recourse to should be directed with the following intentions: — 1st. To the removal of the morbid lesion presumed to exist: — 2d. When this object is unattainable, to retard its progress: — and 3d. To alleviate its effects.

246. *A.* The *first intention* was formerly attempted to be fulfilled by courses of mercury, followed by mineral waters, &c.; and subsequently, and often less injuriously, by the nitro-hydrochloric acid baths. That mercurials were often injuriously employed in many cases of this kind, even where they might have been advantageously prescribed, if they had been directed with greater knowledge of the powers of the various preparations of this mineral, especially in various modes of combination, I have had sufficient opportunities of observing. The error which has commonly characterised the employment of mercurials in organic lesions of the liver, is the exhibition of them, either in doses and forms, or with a frequency and continuance, which are calculated to sink the vital powers, and to weaken the resistance opposed by the constitution to the extension of the local mischief. Where, however, the organic lesions are the more immediate consequence of sub-acute or chronic inflammation, a judicious combination of the mild preparations of mercury with diaphoretics or antimonials, as PLUMMER's Pill with soap and taraxacum, blue pill with antimonials, or with small does of *colchicum*, &c., and a recourse to external derivations, as issues, setons, &c., are often of service.

247. As early as 1823 I had recourse to the preparations of *iodine*, especially to the *iodide of potassium* and *iodide of mercury*, in the treatment of those lesions of the organs attended by enlargement, or characterised by torpor of function, absence of fever, and dropsical effusion from impeded portal circulation; and since then, as stated in the early part of this work (see art. DROPSY, § 103.), I have continued to employ this substance, in some one of its forms and combinations, more especially the iodide of potassium, for the removal of these lesions. Long subsequently to the period just named, this medicine has been resorted to by other physicians in the treatment of organic changes of the liver; but the preparations of it employed, or the doses in which they have been exhibited, or the modes of combining them, have been such as were little calculated to prove beneficial, particularly in the cases for which they were prescribed. In many instances they were exhibited in too large doses, and were inappropriately combined: in others, they were unsuited to the existing pathological conditions. In the first place, the preparations of iodine may prove injurious, by exciting or developing inflammatory action, where it already exists in a sub-acute or latent form, or where a strong tendency to it is present, especially when they are given in large doses, or when those which are more acrid are employed. Where inflammatory action implicates more particularly the surface or membranes of the organ, still greater caution in the use even of the milder preparations of this substance is requisite. It is chiefly when enlargement, obstruction, or torpor of the liver occurs after periodic fevers, or in the scrofulous diathesis, either alone or as a cause of dropsy,

that iodine, particularly the *iodide of potassium*, employed either externally or internally, or both, and in conjunction with other deobstruents, as the *liquor potassæ*, or alternated with purgatives, has proved most beneficial in my practice. In these cases, the iodide of potassium, conjoined with liquor potassæ, may be given with the preparations of *taraxacum*, or of *sarsaparilla*, or in mild, bitter, or stomachic infusions; whilst an ointment containing the iodide (ʒ½ of the latter to ℥j. of the former) may be rubbed over the right hypochondrium, or a *plaster* may be kept applied in this situation, consisting of equal parts of the emplastrum ammoniaci cum hydrargyro, and the emplast. picis compositum.

248. In those cases of enlargement of the liver which are attended by pain, or by sub-acute inflammatory action in some part of the surface of the organ, as well as in other cases where the above means either are inappropriate, or have failed, the *bi-tartrate of potash* in conjunction with the *bi-borate of soda*, in as large doses as the stomach and bowels will tolerate, has often proved remarkably beneficial, especially where the hepatic lesion has superinduced either dropsical effusion, or hæmorrhage, or jaundice. The *nitro-hydrochloric bath*, or lotion, or a course of *these acids internally*, or of the nitric acid alone, may be tried, particularly in enlargement of the liver, as advised above, and aided by deobstruent purgatives, or other appropriate remedies. As regards other means of removing structural lesions of the liver, it is unnecessary to add to what has been fully stated when treating, in the articles Dropsy, Hæmorrhage, and Jaundice, of the most frequent consequences which they produce.

249. *B.* The *second* and *third intentions* of treatment comprise not only the means already mentioned, which can, when they fail in accomplishing the *first* indication, sometimes fulfil the *second*, but also those remedies which have been more especially noticed with reference to those serious symptoms or consequences of organic lesions of the liver just referred to. It is obvious that, when we fail in removing these lesions, some one or more of these consequences will accrue — either *dropsy*, or *jaundice*, or *hæmorrhage*, particularly from the digestive mucous surface, or any two or more of them; and that, either before they may have appeared, or subsequently, those means which I have advised, appropriately not only to either of these superinduced affections, but also to the original malady, should be employed. What these means are will fully appear on a reference to these subjects, especially at the places where they are treated of in connection with hepatic lesions.

250. In most of the more chronic and extensive lesions of the liver, it is necessary, even whilst we employ means to remove them, to retard their progress, or to alleviate their consequences, to support the constitutional powers and improve the general health by medicine, by diet, and by air and regimen. In some cases, restoratives or mild tonics may be conjoined with alteratives, deobstruents, and anodynes: thus the oxides or other preparations of iron may be given with iodine or some one of its preparations, or with the liquor potassæ, and with narcotics or anodynes, according to the nature of the case, especially in the malignant alterations of the organ, when pain sometimes becomes a prominent feature of the malady. In other chronic cases, water impregnated with *chlorine*, or *chlorine fumigation*, as advised by Mr. Wallace, may be prescribed with temporary advantage, as tending not only to excite the functions of the liver, but also to promote the constitutional powers. With these views, certain of the chlorides may be employed, and more especially the chlorate of potash. When there is no tendency to inflammatory action, the bisulphate of potash may be given in the infusion of roses, either with or without small doses of quinine. In cases of enlargement of the liver consequent upon obstinate or repeated attacks of ague, the bisulphate of potash, prescribed so as to act freely on the bowels, is often most serviceable.

251. *C.* The *Diet*, in all diseases of the liver, should receive the strictest attention. The chief rules to be observed are — 1st. To allow only the most antiphlogist diet and regimen when any inflammatory action, or any febrile symptoms, are present: 2d. To recommend the most digestible food in small, or at least very moderate quantity, in all other cases: and, 3d. To advise the adoption principally of farinaceous articles of food; and to allow only a small quantity of the lighter kinds of animal food, once in the day, even in the more chronic and least severe cases. A milk diet is generally of use, especially when the milk is taken with the addition of a small quantity of lime water, or liquor potassæ, or Seltzer water. A diet consisting of milk and the farinacea is very generally appropriate, especially when it is found to agree with the patient.

252. Regular exercise, particularly on foot, or on horseback, sea-voyaging, and warm clothing, the general surface being covered with flannel, are also requisite aids to medical treatment. Change of air, especially to a cool, temperate, and healthy locality, and to a dry and elevated situation, is also of much importance. When such a change can be conjoined with the use of deobstruent saline springs, additional benefit will accrue. In torpid states of the liver, after a long residence in a warm climate, or in chronic affections of the organ, particularly those connected with congestion, enlargement, or infarction, the deobstruent and purgative mineral waters are generally of service. The waters of *Cheltenham*, *Leamington*, *Harrowgate*, or those of *Carlsbad*, *Kissengen*, *Marienbad*, *Homburg*, of *Pulna*, *Seidschutz*, &c., and the artificial mineral waters prepared at Brighton, are severally productive of benefit, when employed appropriately to the varying features of the case, or even of the same case, at different periods of its progress. It is very manifest that the more purgative waters, and those which are most refrigerant and deobstruent, are most suited to cases characterised by enlargement, congestion, or infarction, or attended by febrile commotion: but, in other circumstances, especially where loss of appetite, nausea, debility, rancid evacuations, heart-burn, torpor of the liver, &c., are present, and particularly if these symptoms are aggravated or appear during a course of these waters, those which possess restorative, in conjunction with deobstruent powers, are the most appropriate, and should at least be tried. In many cases the good effects of the waters will be promoted by a recourse to the same waters, as

tepid or *warm baths*, or at a temperature prescribed according to the peculiarities of the case.

Bibliog. and Refer. — *Hippocrates*, Πεϱι των ἐνθος παθων, p. 547. — *Celsus*, l. ii. c. i., et l. iv. c. 8. — *Aretæus*, Chronic. l. i. c. 13.; et Acut. l. ii. c. 7. — *Galenus*, De Arte Cur. ad *Glauc.* l. ii. c. 5. — *Aëtius*, Zetrabib. iii. s. ii. c. 4, 5. — *Paulus Ægineta*, l. iii. c. 46. — *Alexander Trallianus*, l. iii. c. 18. — *Avicenna*, Canon. l. iii. fen. 4. tr. 3. c. 1. 10.; et fen. 14. tr. 2. c. 4. — *G. Piso*, Historia Naturalis utriusque Indiæ. Fol. Amst. 1648. — *Bontius*, De Med. Indor. c. 7. — *Willis*, Pharmac. Rat. p. ii. acet. ii. c. 2. — *P. Alpinus*, De Med. Ægypt. l. iii. c. 4. — *F. Glisson*, Anatomia Hepatis. 8vo. Lond. 1654. — *Sylvius de la Boe*, De Bile et Hepatis Usu. Lugd. Bot. 1666. — *Bartholinus*, epist. ii. p. 637.; et de Respirat. l. iv. c. 23.; Histor. Anat. cent. ii. hist. 85. — *Zacutus Lusitanus*, Med. Pr. Hist. l. ii. No. 107. — *Stähl*, De Vena Portæ, Porta Malorum. 4to. Ital. 1698. — *Bonet*, Sepulchret. l. iv. s. 2. 56. 8. — *J. B. Bianchi*, Historia Hepatica, &c. 2 vols. Gen. 4to. 1725. — *Baglivi*, De Med. Pract. l. i. c. 9. — *F. Hoffmann*, De Morbis Hepatis Detegendis. In Opera, vol. vi. fol. Hal. 1726. — *C. F. Zimmermann*, De Morbis ex Hepatis Vitio. 4to. Ital. 1726. — *A. Burt*, A Tract on the Biliary Complaints of Europeans in warm Climates. 8vo. Lond. 1735. — *C. Jacconi*, De raris quibusdam Hepatis Affectibus. 4to. Bonon. 1740. — *Camerarius*, in *Haller's* Collect. Disput. Pract. vol. iii. No. 102. — *Wainwright*, Anatom. Treat. on the Liver, with Diseases, &c. 8vo. Lond. 1737. — *Morgagni*, De Sed. et Caus. Morb. epist. xxxvi. art. 5, 6. 10. 17. — *Smith*, in Philos. Trans. 1766, art. 13. — *Lind*. Essays on Dis. of Hot Climates, p. 78. — *De Haen*, Rat. Medendi, &c. p. x. c. i. — *M. Stoll*, Rat. Medendi, &c. vol. v. p. 214. — *J. Crawford*, An Essay on a Dis. of the Liver hitherto but little known. 8vo. Lond. 1772. — *W. Heberden*, in Medical Trans. of Roy. College of Phys. vol. ii. Lond. 1772. — *D. Lysons*, Practical Essays on Fevers, Dis. of the Liver, &c. 8vo. Bath, 1772. — *Lieutaud*, Hist. Anatom. t. i. p. 169. — *Wright*, in Med. Facts and Observat. vol. vii. art. 1. — *R. Bath*, A Treatise on the Nature and Qualities of the Dis. of the Liver. 8vo. Lond. 1777. — *D. Millar*, Observ. on Dis. Prevail. in Great Britain. 4to. Lond. 1770, p. 38. (*Abscess of Liver opening in the Back*). — *Sandifort*, Exercit. Anatom. t. ii. c. 8.; et Museum Anat. vol. ii. p. 249. — *S. Matthews*, Observations on Hepatic Dis. in the East Indies. 8vo. Lond. 1783. — *Bang*, in Acta Reg. Soc. Med. Haun. vol. i. p. 107. 300.; vol. ii. p. 55.; et vol. iii. p. 139. — *Ranoë*, in Ibid. vol. iv. p. 85. — *T. Girdlestone*, Essays on the Hepatitis, &c. of India. 8vo. Lond. 1787. — *C. Chisholm*, in Duncan's Med. Comment., vol. xi. p. 275. — *J. P. Frank*, Opuscul. Med. 8vo. Lips. 1790; et De Curandis Hominum Morbis, lib. ii. p. 270.; et lib. iii. p. 265.; et lib. vi. p. 460. — *Home*, Clinical Observat. &c., p. 373. — *F. A. Walter*, Annot. Academicæ de Hepate. 4to. Barol. 1786. — *J. F. Weissenborn*, Von den Eitergeschwüren der Leber. 4to. Erf. 1786. — *J. Andrée*, Consid. on Bilious and Liver Diseases. 8vo. Lond. 1788. — *J. F. Durande*, Observat. sur l'Ether Sulphurique et l'Huile de Terebinthine dans les Coliques Hépatiques. 8vo. Paris, 1790. — *Reil*, Mémorabil. Clinica. fasc. ii. p. 113. — *J. Frank*, Acta Instituta Clinica Viln., ann. i. p. 102.; ann. ii. p. 75. — *J. Clark*, On Dis. in Long Voyages. 2 vols. 8vo. Lond. 1792. — *J. Leake*, Pract. Essay on the Dis. of the Viscera. 8vo. Lond. 1792. — *W. Saunders*, A Treatise on the Structure, Æconomy, and Diseases of the Liver. 8vo. Lond. 1793. — *Jameson*, in Mem. of Med. Soc. of Lond. vol. iii. art. 28. — *Scott*, in Edin. Med. Comment. vol. xiii. p. 188. — *Chisholm*, in Ibid. vol. xi. p. 261. — *Clark*, in Ibid. xiv. p. 95—184. — *Gordon*, in Ibid. vol. xviii. p. 79. — *M. Baillie*, Morbid Anatomy of the Human Body. Lond. 1797; and Series of Engravings, &c. fasc. v. — *Gibson*, A Treatise on Bilious Dis., Indigestion, &c. 8vo. Lond. 1799. — *Thomas Christie*, Hepatitis in India; in Med. and Phys. Journ. vol. ii. Lond. 1799. — *R. Powell*, Observ. on the Bile and its Dis., and on the Æconomy of the Liver. 8vo. Lond. 1800. — *Casson*, in Mém. de la Soc. Méd. d'Emulation. t. v. p. 74. — *Hebreard*, in Ibid. t. vii. — *Cheston*, Patholog. Enquiries, &c. c. 3. obs. 12. — *G. Blane*, in Transact. of Soc. for Improving Med. and Chirurg. Knowledge, vol. ii. art. 2. — *J. L. Rouly*, Disput. sur les Dépôts qui ont lieu au Foie Consecut. aux Blessures. 8vo. Paris, 1803. — *Darwin*, Zoonomia, vol. ii. p. 5. — *A. Portal*, Cours d' Anatomie Med. t. v. p. 303. — *Rademacher*, in *Hufeland*, Journ. der Pract. Heilk. b. i. st. ii. p. 138. — *Fieliz*, in Ibid. b. vii. p. 19. — *A. D. Stone*, A Treatise on Dis. of the Stomach, Liver, &c 8vo. Lond. 1806. — *Monro*, in Edin. Med. and Surg. Journ. 1805, p. 397. — *Firth*, in Lond. Med. and Phys. Journ. Oct. 1807. — *Carlyle*, in Philos. Trans. vol. lvi. p. 123. — *C. R. Pemberton*, Pract. Treat. on Dis. of the Abdominal Viscera. 2d ed. Lond. 1807, p. 38. — *W. White*, A Treat. on Inflammat. and other Dis. of the Liver. 8vo. Bath, 1808. — *J. Curry*, Examination of the Prejudices against Mercury in Liver Complaints. 8vo. Lond. 1809. — *W. Saunders*, Observat. on the Hepatitis of India. 8vo. Lond. 1809. — *H. Campbell*, Objections to the Opinions, &c. of *Dr. Saunders*, in Bilious and Liver Complaints. 8vo. Lond. 1809. — *T. Mills*, Observ. on Dis. of the Liver. 8vo. Lond. 1811. — *Spangenberg*, in *Horn*, Archiv. für Medicin. Erfuhrung. May, 1812, p. 472. (*Hepatitis complicated with Carditis.*) — *J. R. Farre*, Morbid Anatomy of the Liver. Parts i. and ii. 4to. Lond. 1812-15. — *A. Portal*, Observat. sur la Nature et le Traitement des Mal. du Foie. 8vo. Paris, 1813; et Mém. sur Plus. Malad. t. i. p. 178. et 228. (*On Diag. of Dis. of L.*) — *J. Faithorne*, Facts and Observat. on Liver Complaints, &c. 8vo. Lond. 1814. — *C. Griffith*, Essay on the Common Cause and Prevention of Hepatitis. 8vo. Lond. 1816. — *Larrey*, in Dict. des Sciences Méd. t. xvi. Paris, 1817. — *Jourdan*, in Ibid. t. xxi. Paris, 1818. — *G. Ballingal*, Pract. Observ. on Fever, Dysentery, and Liver Complaints amongst Europ. Troops in India. 8vo. ed. 1818. — *H. Marshall*, On the Med. Topography and Dis. of Ceylon. 8vo. Lond. 1821, p. 145. — *T. Mills*, Inquiry into the Effects on the Brain, &c., by Dis. of the Liver. 8vo. Lond. 1819. — *J. Johnson*, A Treatise on Derangements of the Liver, &c. 3d ed. 8vo. Lond. 1820. — *Schmidtmann*, Observat. Med. t. ii. p. 188—258. — *J. B. Regnault*, Mémoire sur les Alterations et l'Influences du Foie, &c. 8vo. Paris, 1820. — *J. Ayre*, Pract. Observat. on Dis. of the Liver and Bilious Complaints. 8vo. Lond. 1821. — *C. Chisholm*, A Manual of the Climate and Dis. of Tropical Countries. 8vo. Lond. 1822. — *W. Wallace*, Researches respecting the Powers of Chlorine in Dis. of the Liver. 8vo. Lond. 1822. — *Kinglake*, in Lond. Med. and Phys. Journ. vol. xl. p. 463. — *Pascal*, in Nouveau Journ. de Méd. t. iii. p. 121. — *Ferrus*, Dict. de Méd. t. ix. Paris, 1824. — *Bouillaud*, in Mémoires de la Soc. Méd. de Emulation, t. ix. p. 170. — *Messager*, in Journ. Univers. des Sc. Méd. t. xxxi. p. 367. — *Nacquart*, in Ibid. t. xxvii. p. 244. — *Bodson*, Rév. Méd. t. i. 1825, p. 481. (*Hydatids of L.*) — *A. Bonnet*, Traitè des Maladies du Foie. 8vo. Paris, 1828. — *Hesse*, Journ. Complement. de Dict. des Sc. Méd. t. xxxvi. p. 397. — *Louis*, Repertoire Génér. de Anat. et Phys. t. i. p. 322. — *Cruveilhier*, Dict. de Med. Pratique. t. viii.; et *Roche*, in Ibid. t. ix. Paris, 1833. — *G. H. Bell*, Treatise on Dis. of the Liver. 8vo. Edin. 1833. — *Kiernan*, On the Anat. and Phys. of the Liver, in Philos. Trans. for 1833. — *Andral*, Anat. Pathologique, t. ii. p. 585. — *B. Voisin*, Nouvel Aperçu sur la Physiol. du Foie et les Usages de la Bile, &c. 8vo. Paris, 1833. — *W. Twining*, Clinical Illustrations of the most import. Dis. of Bengal, with results of an Inquiry into their Nature and Treatment. 2d edit. 2 vols. vol. i. p. 227. Calcutta, 1835. — *C. Morehead*, in Edin. Med. and Surg. Journ. vol. xxxvii. p. 308. — *W. Stokes*, Cyclop. of Pract. Med. vol. iii. p. 44.; and *Venables*, in Ibid. vol. iv. p. 604. — *Cruveilhier*, Anatom. Pathologique du Corps Humain, &c. Fol. liv. xi. et xii. — *Bouillaud*, in Archives Génér. de Méd. t. ix. p. 542. — *Andral*, in Ibid. t. xii. p. 456. — *Briere de Boismont*, in Ibid. t. xvi. p. 5. 381. — *Ripault*, Quelques Proposit. sur les Functions du Foie et de la Veine Porte, &c. 8vo. Paris, 1839. — *M. Reynaud*, in Journ. Hebdomad. de Méd. t. iv. p. 137. (*On Obstr. of the Portal Circulat.*) — *Martinet*, Journ. de Prog. des Sciences Méd. t. xi. p. 248. (*Hyd. Cyst. Recovery.*) — *Pierquin*, in Ibid. t. xiv. p. 252. Ibid. t. v. p. 249. (*Abscess of L. communicating with Pericardium.*) — *W. E. Conwell*, Treat. on the Funct. and Struct. Dis. of the Liver, &c. 8vo. Lond. 1835. — *R. Bright*, Guy's Hospital Reports, vol. i. p. 638. — *Addison*, in Ibid. vol. i. 476. — *Stewart*, Lancet, Jan. 13. 1838, p. 566. — *J. G. Malcolmson*, in Trans. of Roy. Med. and Chirurg. Soc. vol. xxi. p. 91.; et Med. and Chirurg. Rev. vol. xxix. p. 360. — *W. J. Cox*, in Trans. of Roy. Med. and Chirurg. Soc. vol. xxi. p. 331. — *Graves*, Dublin Med. Journ. Jan. 1839. — *W. Geddes*, Trans. of Med. and Phys. Soc. of Calcutta, vol. vi. p. 284. — *J. Gordon*, in Ibid. vol. viii. part i. append. 2. — *Mouat*, in Ibid. vol. vi. p. 1.; and in Med. Chirurg. Rev. July, 1838, p. 306. — *W. J. Cox*, in Ibid. vol. xxix. p. 368. — *J. Johnson* and *J. R. Martin*, The Infl. of Tropical Climates on European Constitutions. 6th ed. 8vo. Lond. 1841. — *Erasmus Wilson*, in Cyclop. of Anat. and Physiol., art. *Liver, Anormal Anatomy.*

LUMBAGO. See Rheumatism.

LUMBRICI. See Worms.

LUNGS — Diseases of. — Syn. *Πνεύμων, ονος.* — *Pulmo*, Lat. — *Poumon*, Fr. — *Lunge*, Germ. — *Polmone*, Ital. — *Lung*.

1. I shall confine myself, at this place, to the

consideration of those diseases which are seated in, or affect chiefly, the substance, or proper structure of the lungs, and which are independent of constitutional peculiarity or affection, and of the diseases of their investing membrane, and of those of the air-passages and tubes, with which, however, diseases of the substance of the lungs are very often associated. Under the heads Bronchi, Croup, Hooping-cough, Larynx, and Trachea, &c., the maladies of the air-passages and tubes are fully discussed; whilst under Pleura, Tubercular Consumption, Asthma, Hæmorrhage-pulmonary, &c., those affecting the investing membrane of the organ, as well as those which, although seated chiefly or even primarily in the lungs, depend upon diathesis, and extend to other parts and organs, are severally treated of. In thus confining myself to the diseases which are more intimately connected with, or are proper to, the substance or parenchyma of the lungs, I shall first consider *Inflammations of the Lungs*, and, subsequently, *emphysema*, *œdema*, *and structural changes of the organ*. The other maladies seated in, or implicating the lungs and air-passages, are, as just hinted at, discussed either under their usual names, or under the head Bronchi and Pleura.

I. Inflammation of the Lungs. — Syn. *Πνεύμονια*, *Περιπνεύμονια* (from *πνεύμων*, the lung); *Περιπνεύμονικη Νόσος*, Dioscorides; *Pneumonia*, Cullen, Parr; *Peripneumonia*, Auct. var.; *Pulmonia*, *Pulmonaria*, Auct.; *Peripneumonia vera*, Sauvages; *Febris Pneumonica*, Hoffmann; *Pneumo-pleuritis*, Dolæus; *Cauma Peripneumonia*, Young; *Empresma pneumonitis*, Good; *Pneumonitis*, Swediaur and Hildenbrand; *Inflammation des Poumons Peripneumonié*, Fr.; *Lungenentzundung*, *Entzundung der Lungen*, Germ.; *Pulmonia*, *infiammazion del Petto*, Ital.; *Peripneumony*.

Classif. — 1. *Class*, 2. *Order* (*Cullen*). 2. *Class*, 3. *Order* (*Good*). III. Class I. Order (*Author*, in *Preface*).

2. Defin. — *Rapid, short, and sometimes oppressed, respiration; cough and expectoration; general feverishness, and uneasiness referrible to the lungs.*

3. Pathol. Defin. — *Inflammation and its usual consequences in the parenchyma of the lungs, often implicating the small bronchi and air-cells on the one hand, or the pleura on the other, or either, more particularly or exclusively.*

4. Of the numerous symptoms attending pneumonia there are, perhaps, none which are present in all cases, excepting the above. The auscultatory signs vary with the stage and intensity or extent of the disease, and, therefore, are not comprised in the above definition. It was shown by me, in the article Bronchi (§§ 41, 42.), and subsequently by Dr. Stokes, that, although pneumonitis may originate in the cellular tissue or parenchyma of the lungs, yet it very frequently arises from an extension of the inflammatory action from the small bronchi to the air-cells and substance of the organ — a mode of origin which had been generally overlooked until I insisted upon it, and contended that the inflammation, when thus originating, may not be confined to the parenchyma of the lungs and the minute bronchi and air-cells, but be extended even to the pleura, producing the usual consequences of pleuritis, as will be more fully shown hereafter. It will be preferable first to consider the *primary* and *simple form of pneumonia*, and afterwards to notice its *principal varieties* or *modifications* and *complications*.

i. Primary Acute Pneumonia. — Syn. *Pure Pneumonia*; *Sthenic Pneumonia*; *Pneumonia vera*; *Simple Pneumonitis*; *Primary Pneumonitis.*

5. *A. The primary seat of Pneumonia* has not been determined with due precision, but has been a subject of some discussion. Several writers have believed it to commence in the plexus of vessels and sub-mucous tissue uniting the minute extremities of the bronchi and air-cells; others state, in general terms, that it is seated in the connecting filamentous or cellular tissue constituting the parenchyma of the organ. Dr. Williams considers "the capillary ramifications of the pulmonary artery and veins to be the proper seat of pneumonia, and that these may involve more or less of the tissues through and around which they pass." — Dr. Stokes describes pneumonia as "inflammation of the cells and minute tubes, and believes that it differs from bronchitis, in the ordinary acceptation of the term, merely in the occurrence of the phenomena of a parenchymatous inflammation, such as solidification, suppuration and abscess — phenomena not proceeding from any inherent difference in the diseases, but a result of anatomical structure." This, however, is all that is contended for. The structure in which the inflammation is seated being such as gives rise to those phenomena when inflamed; other phenomena resulting from inflammation of the bronchial tubes. There can be no doubt, however, that inflammation of the air-cells and minute bronchi will so fill up and obliterate them with the usual products of this state of morbid action, as to give rise to appearances similar to those consequent upon an infiltration of the same products in cellular or parenchymatous structures; and that, when the inflammatory action originates in the latter, it will give rise to changes similar to those produced by it when commencing in the minute tubes and cells; inflammation of these latter being rarely confined to them, but extending to the parenchyma, or filamentous tissue of the organ; or, in other words, that the morbid action may originate and predominate in either series of structures, but that it rarely continues without implicating both.

6. The French pathologists, and after them some recent English writers, have distinguished the disease into *lobar*, *lobular*, and *vesicular*, according as it extends to the whole or continuous parts of lobes, or is limited to certain polygonal subdivisions of these, or to single bunches of vesicles. —*a.* Of these the *lobar* is the most common; it may be confined to an irregular portion of a lobe, or may extend to a whole lung, or to a great part of both lungs. When the inflammation is very extensive it commonly exists in different degrees of advancement, as will more fully appear in the sequel.

7. As to the parts of the lungs most frequently attacked, Morgagni, Frank, Broussais, &c., judging from *post mortem* inspections, inferred that the upper lobes were oftener affected than the lower; whilst Laennec, Andral, Chomel, and others, comprising the slighter cases and those of recovery, considered that the lower lobes were most frequently inflamed. M. Chomel found, out of 59 inspections, that the apex was

attacked in 13, the base in 11, and the whole or central parts in the others. In general, the upper lobes are more frequently affected than the lower in the most dangerous cases, and when the disease assumes a low or adynamic form. M. ANDRAL found in 80 cases, 57 of the lower lobe, 30 of the upper, and 11 of the whole lung. The proportion, however, in which the upper lobe is affected appears greater, according to this calculation, than obtains in this country.

8. *b.* In the *lobular* state of pneumonia, the inflammation is confined to a few isolated lobules, being limited by the interlobular cellular tissue, and appearing as lozenge-shaped or polygonal patches of red, engorged, or hepatised tissue. This form seems to commence at the same time in several distinct parts, and is most frequently observed in cachectic persons, or subsequently to phlebitis, accidents, operations, &c.

9. *c.* The *vesicular* form of pneumonitis has been distinguished by M. ANDRAL. He supposes it to be confined to the air-cells or vesicles. It appears as little red spots, varying in size from that of a pin's head to that of a hemp-seed, and in colour from a blood to a livid red. It is not often observed, at least in a distinct form, unless the colour of the lung be light. The tissue of the organ surrounding these red spots are sometimes healthy, and they often contain the miliary granulations of BAYLE.

10. *d.* As to *the lung* most frequently attacked, Dr. FORBES has shown, from the observations of ANDRAL, CHOMEL, and LOMBARD, that, out of 1131 cases, the right lung was affected in 562 cases, the left in 333, and both the right and left in 236; in every ten, five being in the right, three of the left, and two in both. Dr. STOKES remarks, that this very nearly agrees with his experience; but that double pneumonia is more frequent than appears from this statement; for it commonly happens, that although disease greatly preponderates in one lung, more or less of it may be detected by a careful physical examination in the other, even when pain or uneasiness is not referred to it. He further observes, that inflammation of the right lung is oftener of the sthenic, and that of the left of the nervous or typhoid character. According to my own experience, it is undoubted that double pneumonia most frequently occurs in the previously diseased or cachectic, in the nervous or debilitated, in states of the air causing vital depression, and during epidemic constitutions, or in the course of epidemic diseases, characterised by impaired tone and lowered vital resistance.

11. *B. Usual Course of simple Sthenic Pneumonia.* —*a. Certain premonitory symptoms* are often observed, unless the disease proceeds from the more violent causes, or from wounds or accidents. These consist of oppression in the chest; a slight short cough; quickness and shortness of breathing, especially on motion, speaking aloud, or on ascending an eminence; languor, and occasional sighing. These usually continue a day or two, and are followed by those characterising,

12. *b. The invasion* of the disease. This event is indicated by marked rigors or chills, continuing from half an hour to one, two, or more hours. These are not, however, observed in all cases, or are so slight in some as to escape notice. Attending this state of febrile exordium, and in addition to the usual concomitants of it, anxiety, difficulty of breathing, oppression in the chest; short, dry, or suppressed cough; general uneasiness, loss of appetite, &c., are usually complained of.

13. *c.* The *increment* or *developement* of the disease follows the disappearance of chills or rigors. Animal heat gradually increases until it assumes a marked character; and with it are developed vascular reaction, vital turgescence, and general orgasm of the circulation. The symptoms especially referrible to the inflamed organ now more particularly manifest themselves.

14. Respiration becomes short, frequent, anxious, and difficult; is attended with unusual expansion and elevation of the chest; with a frequent, small cough, and increased warmth and moisture of the expired air; and, as the disease advances, is performed chiefly by the diaphragm and abdominal muscles, the chest apparently remaining unmoved, especially on the side chiefly affected. The patient is unable to take a deep inspiration, the turgid and inflamed lung being incapable of further expansion; nor is he able to expire freely, the organ being equally incapable of collapsing; and he lies, in preference, on the affected side, or, if both lungs are diseased, in the supine posture. There is a constant feeling of uneasiness, rather than of pain, complained of in the chest, with anxiety, a sense of constriction, fulness, internal heat, and of weight. There are constant restlessless, inquietude, and tossing, with frequent attempts to elevate the chest and shoulders, proceeding from the great vascular turgescence of the lungs, and obstacle to their further expansion, to attempt which the patient feels irresistibly called. The cough at the commencement is dry, troublesome, and short, accompanying almost each expiration, especially after a full inspiration, and constant: it afterwards becomes more moist, and is attended with a scanty mucous, crude, or albuminous expectoration, of a saffron hue, or streaked with blood. Still the dyspnœa is slight, respiration being quick, short, and frequent, but not difficult.

15. Sometimes a lancinating pain darts through either side of the chest, indicating irritation of the pleura, proceeding either from coëval and consecutive inflammation of a portion of pleura, or merely from the unusual degree of tension experienced by this membrane, owing to the turgid or expanded state of the lung enveloped by it. In the former case, the pleuritic pain is sharp, acrid, continued, and fixed to one part; forming the very frequent *complication* of inflammation of the substance of the lungs with inflammation of its investing membrane, or *pleuro-pneumonitis*, which will be more fully noticed hereafter. In the latter case it is less fixed or continued, and disappears as the vascular turgidity diminishes, and upon the first approaches towards a resolution of the disease.

16. The symptoms which have a sympathetic relation to the disease are less constant, and are less to be depended on than the above and the physical signs (§ 48.): they have generally more reference to the degree of symptomatic fever than to the extent of local disease. They chiefly consist of turgidity of the countenance, with flushing of the cheeks, sometimes circumscribed, particularly towards the period of the evening; febrile exacerbation; gravative head-ache,

× A [illegible] of the [illegible] of Physic-
[illegible] the [illegible] to Professor
[illegible] Pages?

vertigo, suffusion and watering of the eyes; a humid tongue, covered by a thick mucous coating; constant thirst; anorexia; tension of the abdomen, with increased action during respiration, and peculiar uneasiness about the insertion of the diaphragm; costiveness; scanty, high-coloured, reddish, crude or turbid urine, with scalding upon voiding it; palpitation of the heart; great action of the arteries; a quick, full, and hard pulse, — in children so quick as scarcely to be counted. The pulse is also sharp; but the hardness generally ceases early in the disease, and it often becomes soft, weak, or small. In some cases, it is soft and small from the commencement. As the disease advances, lethargy or symptomatic delirium sometimes occurs; or more rarely, and in still more unfavourable cases, sopor or coma, more or less profound, supervenes. Blood taken from a vein is more thick and dense than usual, and exhibits a thick, tenacious crust on its crassamentum, with little serum, or the coagulum is very firm and large.

17. The more severe the disease, and the more extended its seat, the more intense are all the symptoms, both local and general. They are always exacerbated towards evening and ameliorated in the morning. When both lungs are inflamed, all the foregoing symptoms are particularly marked, and vital power more prostrated or more readily exhausted, the constitutional symptoms assuming more of the adynamic character; out even when both are affected, the inflammation is generally limited to portions of them only.

18. When one lung only is inflamed, the sense of heat, tension, weight, &c., is chiefly confined to the same side as it, and on this side the patient lies with most ease; reclining on the unaffected side producing great anxiety and uneasiness. Respiration also is performed unequally, or only by one side of the chest, that containing the inflamed lung being nearly inactive during inspiration, but considerably elevated.

19. Circumscribed redness of the cheek of the same side is often observed, and frequently, particularly in children, the hand and wrist of the affected side are red and turgid, apparently owing chiefly to the pressure on the upper part of the arm, from constantly lying on the affected side.

20. *d.* The *Period of fully developed Disease* occurs in from three to five days, according to the severity of the attack. The symptoms continue for some time afterwards, generally for three, but seldom beyond five days, with slight exacerbations and remissions, especially when left to nature or inefficiently treated, and with occasional signs of a disposition to crisis. The dyspnœa is then more urgent, and the respiration short and rapid. The head and shoulders require to be raised. In the worst cases, inspirations are short, forced, and as frequent as from 40 to 50, or even 60, in a minute. The expectoration is then very viscid, tenacious, streaked with blood, or more deeply and intimately tinged by it. The pulse is quicker, weaker, and smaller; the strength more depressed, and the tongue is more loaded, and sometimes dry. In a few cases, where temporary ameliorations and exacerbations occur, the disease is protracted several days beyond the period just mentioned.

21. *e.* The disease may continue, or even increase, notwithstanding the treatment. In such very *unfavourable* or *fatal cases*, the thorax remains expanded, or scarcely acts, during respiration, which is chiefly diaphragmatic, or acts suddenly, forcibly, or convulsively: the patient is oppressed with the utmost anxiety, harassed by continued cough, dosing occasionally, or lapsing into a dreamy delirium, until the lungs having become nearly unfit for the office of respiration, or nearly impermeable to the air, he is entirely suffocated. This event is generally preceded by a bloated, pallid, or cadaverous countenance, which is bedewed with a cold sweat; by livid lips, dark or livid tongue, great difficulty and quickness of respiration; by suppression or change of the appearance of the sputa, which become greenish, dirty-red, rusty, or like prune-juice, and fœtid; by a rapid, thready, irregular or intermittent pulse; and by a gasping, convulsive, and rattling respiration. This unfavourable change often happens during the evening exacerbations, or perturbating efforts of nature to establish a critical evacuation.

22. A *favourable result* is sometimes preceded by a gradual disposition to a crisis, which is occasionally decided, and sometimes interrupted or abortive. This issue generally is observed to occur in the morning on the fifth, seventh, ninth, eleventh, or fourteenth day of the disease — very rarely so late as the twenty-first day. The evacuations which are most beneficial are copious and general perspiration, hypostatic urine, a free mucous expectoration, epistaxis, and the catamenial and hæmorrhoidal fluxes.

23. In ninety-three cases, M. ANDRAL observed that the recoveries on critical and non-critical days was as fourteen to three.

24. *f.* The *Decrement* of the disease always follows the subsidence of the morbid condition of the organ, whether brought about by the conservative influence of the vital energies or by art. The vascular turgidity, infiltration, and condensation of the parenchyma of the lungs gradually diminish, the functional disturbance decreases, and all the symptoms at first subside, and afterwards some of them entirely disappear: but those which were first to manifest themselves, as cough and oppression at the chest, are the last to depart. Some degree of quickness of pulse and of breathing generally continues for some time. When these are removed, *convalescence* has commenced; but convalescence can never be confided in, until these symptoms have entirely disappeared.

25. Acute pneumonitis, marked by no anomaly, complicated with no other malady, and occurring under favourable circumstances, generally proceeds as now described, and most frequently to a favourable issue. But it does not always observe this course. It is sometimes of much longer duration. In some cases it assumes, from the commencement, a more adynamic, or a complicated, or an otherwise unfavourable character. Occasionally unwonted and accidental symptoms manifest themselves in its progress, owing to various contingent causes operating during its continuance; and in other cases the whole tendency and character of the disease becomes changed, owing either to causes proper to the individual affected, or to a peculiarity of the nature and combination of the external agents which produced it, or to the state of the season or of the atmosphere, or to the epidemic constitution upon which it may supervene.

26. *g. Relapses* of pneumonia are not infrequent during some period of convalescence. They are indicated by a recurrence of the characteristic symptoms — chiefly by slight dyspnœa, short frequent respiration, oppression in the chest, cough, viscid or sanguineolent expectoration, and by increased frequency and weakness of pulse. In cases of relapse, the lungs often become more extensively affected, and the attendant fever assumes a less sthenic form than the first attack — even an adynamic character. This is owing to the reduction of nervous power, and to the imperfect change effected in the state of the blood. Hence relapses are always more dangerous than a first seizure, and are more rarely attended by critical evacuations.

27. ii. STRUCTURAL CHANGES MARKING THE STAGES OF PNEUMONIA. — LAENNEC described *three stages*, with their corresponding symptoms and signs. In his *first stage*, the lung is engorged with blood, and a crepitating râle is heard. In the *second*, solidification takes place, and gives rise to its characteristic physical signs. In the *third stage*, interstitial suppuration occurs; or a state of softening, preceding the formation of abscess. I agree with Dr. STOKES, who contends for a stage antecedent to that which M. LAENNEC has called the first. He observes, that the existence of crepitation indicates that secretion has taken place in the cells and minute tubes, so that LAENNEC's first is, in reality, the secretive stage of the inflammation, and every analogy favours the opinion that a stage of irritation has existed previous to the secretion which caused the crepitus. It is obvious that this first stage of irritation and capillary injection can be but very rarely seen, unless death has proceeded from other causes; but in these circumstances I have observed, as remarked by Dr. STOKES, portions of the substance of the lungs of a bright vermilion colour, and even drier than usual. It is sometimes met with in parts of the lungs where the first and second stages of LAENNEC exist; and I have seen it in portions of the organ, after death from hæmoptysis and acute phthisis, with which, as I shall show in the sequel, pneumonitis is not infrequently complicated.

28. The *stages* of pneumonia, therefore, are,—1st. Intense capillary injection — no effusion into the cells: — 2d. The cells and parenchyma engorged with blood, without actual disorganisation — sanguineous engorgement — first stage of LAENNEC: — 3d. Solidification, with some degree of softening — red hepatisation — the red softening of ANDRAL — second stage of LAENNEC: — 4th. Interstitial suppuration — yellow hepatisation — the third stage of LAENNEC. *Abscess* and *gangrene* are contingencies of comparatively rare occurrence.

29. *A.* In the stage of *sanguineous engorgement*, the substance of the organ is red, but of different shades, is heavier than usual, and is still crepitant. The cells are not yet filled by effused fluid; or, if any infiltration into them or into the interstices of the filamentous tissue has taken place, it is only slight, unless, indeed, in cases of asthenic or cachectic pneumonia, or when the disease follows inhalation of noxious gases, or occurs in the course of low fevers or exanthematous maladies; and then this state of engorgement may pass very rapidly, and without any appreciable crepitation, into the stages of suppuration, or into a half-suppurative and half-gangrenous state. In the usual sthenic form of the disease, however, with capillary engorgement, there are some degrees of thickening of the membranes between the cells, and slight effusion of lymph, to which the apparent thickening probably is chiefly owing.

30. *B.* The stage of *solidification* and *softening*, or of *hepatisation*, presents the former stage in a more advanced state — in a state of more or less rapid progression to the next. In this stage the effusion of lymph, often more or less coloured by red particles of blood, has taken place into the parenchyma and air-cells of the part affected. The density thus produced is generally so great that this part sinks in water. It is also more friable, from the interstitial infiltration of lymph having weakened the vital cohesion of the tissues, as shown in the art. INFLAMMATION.

31. Dr. STOKES agrees with ANDRAL in supposing that this solidification arises not from any deposition of lymph, but merely from excessive congestion of blood; and in proof of this he argues that the rapid appearance of this stage, and the rapid subsidence of the symptoms attending it, are evidences of no further change than congestion. But this is to assume that excessive congestion is attended by the same phenomena as accompany infiltration of lymph; and these occurrences are no disproofs even of effusion of lymph having occurred, for it is well known that absorption in the lungs is sometimes remarkably rapid.

32. The colour of the solidified portion of lung varies, according to the quantity of blood injecting the capillaries, from a red to a pinkish brown or reddish grey; but it is modified by the quantity of lymph infiltrating the part, and by the presence of black pulmonary matter. Frequently when a portion of hepatised lung is divided, numerous little granulated points, the size of pins' heads, and of a lighter colour than the surrounding tissue, appear. LAENNEC considered these to be the air-cells converted into solid grains by thickening of their parietes, and by the obliteration of their cavities by a concrete fluid. ANDRAL viewed them as single air-cells or terminations of the bronchi distended by a viscid mucus from their mucous linings. If this be the case, and if it be not coagulated lymph, the mucus must have become concrete during its retention. It is, however, most probable, that these granules are produced by an infiltration of lymph into the cells or minute tubes, as well as into the connecting cellular tissue.

33. In some cases the solidified lungs are devoid of the granular appearance just noticed, and are of a more uniform and deeper red than the foregoing. M. ANDRAL attributes this state to a more uniform and complete obliteration of the cells; but if such is the case, there must have been also more intense capillary injection. Dr. WILLIAMS thinks that this non-granular form of hepatisation may be ascribed to the circumstance of the inflammation having been confined chiefly to the intervesicular tissue. MM. HOURMANN and DECHAMBRE have also distinguished the *granular* from the *non-granular* form of solidification, and have designated the former *vesicular* pneumonia, and the latter *interlobular*. Dr. WIL-

LIAMS's appellation of *intervesicular* is, however, more appropriate.

34. *C.* The stage of *interstitial suppuration*, or of *puriform infiltration* — of *yellow hepatisation*, — is merely the conversion of the affused lymph and red particles of the previous stage into an opaque, pale yellow, soft, and semifluid matter, and ultimately into a purulent liquid, which infiltrates the inflamed part. This conversion takes place in the manner shown in the articles ABSCESS and INFLAMMATION; but the matter rarely is confined in the form of a defined abscess, but is more or less diffused, owing to the structure of the organ, through the part affected. Owing to the organisation of the lungs, a distinct abscess is rarely formed, because the lymph thrown out can rarely confine the matter, or prevent its infiltration of surrounding parts, by completely obstructing the minute tubes, cells, and pores permeating the inflamed part.

35. *a. Abscess*, therefore, cannot be considered as a stage of pneumonitis, but merely a contingency of comparatively rare occurrence, but not so rare as LAENNEC and some others have supposed. I agree with Dr. STOKES in believing that the rarity of pneumonic abscess has been much overrated; and it is most probable that LAENNEC was partly deceived by trusting too implicitly to the physical signs, to the neglect of the rational symptoms, in his observations. Attention to the whole course of the case, and to the succession of both rational and physical signs throughout it, will alone guide the observer aright. The actual existing phenomena derive the chief part of their value, in forming a diagnosis, from a recognition of those which preceded them. Dr. STOKES states that abscess occurs more frequently in the lower than in the upper lobes, and that he has met with instances of its cure by cicatrisation. It may result from localised phlegmonous inflammation, or from the extensive and complete solidification above described. I have seen it chiefly after phlebitis, injuries, wounds, and operations, and in connection with erysipelas; but in these the inflammation or solidification around the abscess, of which there were often several, was neither intense nor extensive.

36. Without reference to those purulent collections in the lungs which result from venous absorption, Dr. STOKES has seen acute pneumonic abscess under *three forms*:—1st. As an encysted abscess, with all the characters of true phlegmon: — 2d. As purulent cavities communicating with the bronchi, and without any cyst, the walls of the abscess being formed of the solidified lung: — 3d. The abscess is seated under the pleura, and external to the pulmonary tissue, dissecting the latter from the former, so as to show the structure of the lung.

37. *b. Gangrene* is another contingent result of inflammation of the lungs. It is rarely observed unconnected with suppuration; but it may be rapidly caused by the inhalation of noxious gases, which may so impair the vitality of portions of the lungs as to favour the occurrence of gangrene before the suppurative stage can be developed. In other cases, it has not been determined whether or not this change depends upon the intensity and suddenness of the congestion, or upon the cachectic state of the patient — most probably upon both. It has also been attributed to inflammation of a principal vessel supplying one or more lobules. In the interesting cases adduced by Dr. STOKES, the patients were long addicted to the use of spirits, a cause which operates upon the vascular system in a more direct manner than has been generally supposed; and likewise in all were evidence of extreme congestion, and typhoid, or, more correctly, asthenic pneumonia.

38. *c. The state of the Tissues* adjoining the vascular plexus of the pulmonic parenchyma is deserving some notice. Dr. WILLIAMS states that the interlobular cellular texture is sometimes red, and sometimes singularly free from redness, or partakes of it in a much less degree. In the latter case, the hepatised lung presents somewhat of a marbled appearance. The interlobular septa retain their cohesion, and in more chronic cases are thicker and denser than usual. The mucous membrane of the large and middle-sized bronchi is generally more or less inflamed, presenting the same striated appearances seen in acute bronchitis. The smaller bronchi is commonly of a deeper red than in that disease. The bronchi in the inflamed part often partakes of the softening of the parenchyma. In some instances they are plugged up with an albuminous exudation; but this arises from the extension or association of inflammation of one series of tissues to that intimately connected with it. More commonly the air-tubes, as far as they can be traced, contain more or less of the rusty mucus or muco-puriform matter which has been expectorated. The pleura is very frequently inflamed. It may, however, be free from redness, or from lymph or liquid effusion, even when covering a hepatised portion of lungs (§ 30.).

39. iii. DIAGNOSIS OF SIMPLE PNEUMONITIS. — *A. By the aid of certain rational Symptoms.* — There is hardly one of the symptoms described above that may not be present in other diseases, or be absent in pneumonia. When it is considered that pneumonitis is associated, in the very great majority of cases, either with pleuritis or with bronchitis, or with both; that it may be consequent upon, as well as give rise to either, it becomes the more difficult to determine what are the phenomena which distinguish the simpler states of the disease. Generally, local symptoms, especially fulness, soreness, oppression, or uneasiness in some part of the chest, smallness and increased frequency of pulse, are complained of before chills or rigors occur, and before the constitutional symptoms are fully developed.

40. *a.* The *cough* in pneumonia varies remarkably. It is often slight, short, and occasional, and not such as gives much uneasiness to the patient. In other cases, particularly where the bronchi are affected, and in proportion to the extent of their affection, the cough is severe; at first dry, and subsequently attended by expectoration. If the pleura be at all affected, the cough is generally short, suppressed, sometimes infrequent, but it varies much according to the extension and amount of disease. The cough presents more diversified and more prominent features in the complications of pneumonia than in the simple disease.

41. *b.* The *expectoration* may furnish very decided evidence of pneumonia in some cases, whilst in others it can in no way assist the diagnosis. In *children* especially, amongst whom pneumonia is a most frequent and dangerous malady, the expectoration furnishes no diagnostic aid. The viscid,

muco-puriform, and sanguinolent character of the sputum, although observed in many cases, is by no means constant. The disease may present all the kinds of expectoration, particularly during its early stages, and it may be even unattended by any until its most advanced stages, or until shortly before a fatal issue. The *rusty sputum* is generally found in the most acute cases, and in robust persons; but, in feeble constitutions, or where the disease occurs as a complication of, or during convalescence from, continued or exanthematous fevers, it is not often observed: indeed, in these circumstances, the sputum furnishes comparatively little information, or it may be altogether wanting or very scanty. Although it is generally true that the viscid and red sputum occurs only at the height of the disease, yet it may continue for some days after the subsidence of the more acute symptoms, or even after all signs of pneumonia have disappeared. Instances of this latter occurrence have been furnished by ANDRAL and STOKES, but in these cases it is evident that the inflammation continued to proceed in the bronchi, after that of the parenchyma of the lungs had subsided.

42. In the suppurative stages the sputum assumes a more characteristic form than in the preceding, and is either a purplish red muco-puriform fluid, or a homogeneous purulent matter of a light yellow colour, and of the consistence of cream. These kinds of expectoration occur only in the far advanced or suppurative stage — of interstitial suppuration and softening (§ 34.). Dr. STOKES remarks that there are no differences in the local changes between the cases with prune-juice-like sputum, and those in which there is a secretion of healthy pus; but he admits, with all other observing physicians, that in the former the disease exists in a lower, or more asthenic type, or in broken-down constitutions, whilst the latter is seen in the more sthenic cases, occurring in young or robust persons.

43. In *pulmonic abscess*, and as long as the matter continues pent up, or before it has found its way into the bronchi, the sputum presents no characteristic appearances. In many cases nothing is expectorated but a little mucus; whilst in others it is muco-puriform, as in chronic bronchitis, and either devoid of smell or more or less fœtid. If, however, an abscess form and burst into the bronchi, the expectoration becomes suddenly abundant, and distinctly puriform.

44. *Gangrene* is attended by an expectoration of a dirty greenish, or brownish or sanious matter, mixed with a muco-puriform matter; the whole being of a putrid and very offensive odour, and occasionally mixed with sloughy portions of tissue.

45. As the powers of life sink, the expectoration in the advanced stages becomes scanty, or is altogether suppressed. The suppression, however, does not proceed from any diminution of the secretion, but from the failure of the respiratory acts, and of the vital manifestations of the organ, both of which are insufficient to procure its expulsion. Thus in fatal cases the mucous rhonchus increases and extends as death approaches, until the accumulated secretion mounts to the large bronchi and trachea, when the rhonchus becomes tracheal, and assumes the character to which the appellation *death-rattle* has been given.

46. *c. Dyspnœa*, as remarked above (§ 14.), is more urgent in bronchitis, or even in pleuritis, than in pure pneumonia; and, generally, the amount of dyspnœa indicates in some measure the extent to which the latter is associated with the former, particularly with bronchitis. However, extensive or double pneumonia will increase the dyspnœa, but it will increase the frequency and shortness of respiration more than any actual sense of difficulty. This latter often depends more upon an attendant irritation or spasm of the bronchi than upon actual inflammation of them.

47. *d. Pain* is often but little felt. Uneasy sensation is generally present; but it seldom amounts to pain, unless the pleura becomes implicated in some way or another. The mere tension of this membrane consequent upon inflammatory turgescence of the parts underneath can hardly develop this symptom to any permanent or marked degree. In the last stage of the disease, the functions of the lungs, or arterialisation of the blood, is interfered with, but not so early or so rapidly as in bronchitis, unless when associated with it — an association which will often mask pneumonitis without the aid of physical diagnosis.

48. *B. The physical Diagnosis of Pneumonia.* — It is chiefly upon the *physical signs* that reliance is to be placed in determining the existence of pneumonitis. Dr. STOKES has enumerated the following as the most important relations of these signs: — 1st. Evidences of a local excitation; — 2d. Proofs of sanguineous congestion; — 3d. Evidences of a diminished quantity of air in the affected lung; — 4th. Signs of increased solidity of the lung; — 5th. Phenomena of the voice; — 6th. Phenomena referrible to the circulating system; — 7th. Evidence of accompanying lesion of the pleura; — 8th. The diminished volume of the lung.

49. *a.* In the *first stage* of pneumonia, or that of inflammatory irritation (§ 27.), the physical signs have not been observed with due precision. Dr. STOKES believes that it may be inferred, by the occurrence of a local puerility of respiration, combined with an excitement of the respiratory system. It is evident that this sign, namely, an unusually loud sound of respiration, in a part of the lung, in connection with inflammation of it, can be present only for a short time, and often before the patient comes under treatment; and that its chief value is in connection with disorder of the respiratory and circulating actions, and with the succeeding phenomena.

50. *b.* In the *second*, or LAENNEC's *first, stage* (§ 29.), the crepitating rhonchus, and the gradually diminishing vesicular murmur, are the characteristic signs. Still these signs derive their value chiefly from their combination, and partly from the accompanying, the preceding, and the consequent phenomena.

51. *Crepitation*, which has been most accurately compared by Dr. WILLIAMS to the sound produced by rubbing a lock of hair close to the ear, is not so invariable and positive a sign of pneumonia as LAENNEC supposed. It is to be relied on only when attended by increasing dulness, and by the gradual cessation of the respiratory murmur. If the disease be so extensive as to impede greatly the functions of the lungs, the

energy and frequency of the respiratory movements will be increased, and the respiratory murmur in the sound side may be thereby rendered louder than usual. The increasing density of the congested and inflamed lung will deaden the sound emitted by percussion, so that the affected side will give out a sound somewhat duller than that of the opposite side; although not so dull as will be emitted at a more advanced stage, as there is sufficient air still contained in the affected lung to prevent complete dulness on percussion. The increasing density of the diseased lung renders it also a better conductor of sound; so that during this stage of extensive pneumonitis, and whilst crepitation is still present, some degree of the bronchial respiration and vocal resonance, present in the following stage, may be heard.

52. *c.* In the *third stage* (§ 30.), the cells being obliterated, crepitation and vesicular respiration cease; and, as the large tubes remain pervious, "dulness of sound, bronchial respiration, and a loud resonance of the voice are produced; and *within certain limits*, the extension or intensity of these signs furnishes an accurate measure of the extent or intensity of the disease." The bronchial respiration requires for its production not only increased density of the lung, but also a certain expansion of the side during respiration; for when the whole lung becomes solid, the side is fixed, and the bronchial respiration ceases. In this latter case, the signs are universal dulness, absence of respiration, and resonance of the voice. If, however, the upper portion begins to resolve, or even if an abscess be formed, in either of which cases the bronchial tubes admit again a portion of air, the bronchial respiration returns; it not being necessary that the permeable portion of lung should be of great extent to reproduce this state of respiration.

53. In cases of universal solidification of a lung, the disease may be confounded with extensive empyema, if the history of the case and succession of the signs be not attended to; but there are generally the signs of visceral displacement attending the latter, with absence of vocal vibration or fremitus, characterising solidification of the lung. When this change is complete, particularly in the central parts of the organ, the voice may be heard over a considerable space in the mammary, axillary, and scapular regions. The bronchophony, or vocal resonance of the tubes, may be so loud as to be mistaken for the pectoriloquy of a cavity; but it is distinguished from this latter by its diffusion over a large space, and by its being much diminished by using the stethoscope with its stopper. Dulness on percussion is generally complete when a whole lung is hepatised; but still it is seldom so uniform and general in the lower and middle portions of the chest as in cases of pleuritic effusion; for some of the lobules still continue to retain air, and the large tubes furnish some degree of resonance in the parts nearest to them. In proportion as the lung is solidified, so does it become inexpansible, and the corresponding parietes of the chest motionless, without their being distended or contracted, and without displacement of adjoining viscera or fullness of the intercostal spaces. When the left lung is solidified, it transmits the sounds and impulse of the heart to an unusually wide extent.

54. In the usual sthenic pneumonia, dulness of sound and bronchial respiration are preceded by crepitation; but in some cases of asthenic pneumonia solidification takes place so rapidly as not to be preceded by these signs, in a very appreciable form, or for a time sufficient to admit of their detection. In these cases the disease proceeds with great rapidity, and it becomes difficult to distinguish it from pleuritic effusion, unless the phenomena above alluded to be carefully observed; namely, the absence of displacement of viscera, and of fulness of the intercostal muscles, the resonance of the voice, the greater frequency of bronchial respiration, and the occasional occurrence of a rhonchus in parts of the chest. The disease rarely proves fatal in this stage, unless it be extensive, and both lungs are more or less affected.

55. *d.* In the *fourth stage*, or that of *suppurative infiltration* (§ 34.) the physical signs are not materially altered until the effused matter accumulates in the bronchi so as to occasion a sharp and peculiar muco-crepitating rhonchus, the bronchial respiration still continuing, and the dulness of sound on percussion increasing; but these phenomena should be viewed in connection with the previous history and existing state of the case. When, however, this peculiar rhonchus occurs in the circumstances described, and is connected with signs indicating an extension of disease in the lungs, it may be considered as truly the result of suppurative infiltration of the lung. Still there are some cases in which this stage may be with more certainty inferred from the duration of the disease and from the rational symptoms than from the physical signs; in it the prune-juice expectoration sometimes occurs, or the purulent sputum; but either may be absent, and little or nothing may be expectorated excepting a mucous or muco-puriform fluid from the larger bronchi, and that only in small quantity. In this stage, however, the attendant fever assumes an adynamic form; and rigors, followed by sweats; a small, quick, weak pulse; a short, frequent respiration, with a sense of want of breath; a pallid, waxy countenance, with incipient lividity of the lips, anxiety, low delirium, &c., indicate the local extent of lesion, and the consequent effect produced by it upon the pulmonary functions, and the vital manifestations generally. It is chiefly in this stage, particularly when the disease is limited, that a fatal issue takes place.

56. When an *abscess* forms in this stage, a favourable result may take place nevertheless, and even more frequently than in the state of suppurative infiltration just noticed, inasmuch as the former change indicates more sthenic action and greater constitutional energy than characterise the latter. The signs of abscess are nearly the same as those of a tuberculous cavity communicating with a bronchus. The diagnosis is to be inferred chiefly from the history of the case, a cavity from tuberculous excavation being of much slower progress, and preceded by much less acute symptoms, than that from abscess. Nor is it attended by so great an extent of dulness as is observed in pneumonia. A cavity from an abscess occurs most frequently at the inferior portion, or about the root of the lung; and, owing to the quantity of fluid contained in it, upon its first communication with a bronchus, it gives rise,

at that time, to gurgling or bubbling sound upon a deep inspiration or coughing; and in some cases there is a putrid or fœtid odour with the expectoration and breath of the patient, but chiefly when some degree of gangrene occurs or accompanies the abscess.

57. *e.* As to the *more circumstantial diagnosis* of true pneumonitis, it may be noticed that crepitation heard throughout the greater part or the whole of a lung shows extensive disease; if it be heard at the apex or root of the lung, or in the infra-clavicular and scapular regions, it evinces a more intense form of disease than if it were seated in the middle or lower lobes. The extension of crepitation to parts not previously affected by it shows the increase of inflammation; its cessation, and the substitution of bronchial respiration and perfect dulness on percussion, are proofs of solidification; and the return of crepitation and resonance, where they had been replaced by bronchial respiration and dulness, indicates absorption of the effused lymph and the admission of air into the cells; and consequently a progress towards recovery; but a change from complete dulness and bronchial respiration to clearness and return of the respiratory murmur, without any crepitus of resolution, may take place; and when this sound is heard, it is of a looser and less even character than before — a sub-crepitation merely. If solidification have advanced far and approached to suppurative infiltration, the restoration of the natural structure of the lung becomes proportionately difficult and prolonged to the extent of lesion. The cure may be eventually complete, but more frequently permanent alteration is produced, more especially obliteration of some of the cells and small bronchi, and dilatation of others. *Bronchophony* is most evident when dulness on percussion and bronchial respiration coexist, and it is always most evident in the superior and posterior parts of the chest. It is readily distinguished from pectoriloquy by its greater extent, and by the absence of gurgling or cavernous respiration. It sometimes approaches the ægophonic character, when the pneumonia has passed into the fourth stage, and when resolution from the third is taking place.

58. When pneumonitis is limited to a central or deep-seated part, especially near the base, of the lung, without extending to the surface, the physical signs may be very obscure, and the rational symptoms thus become more important. When the inflammation is very circumscribed, even although it may affect a more superficial portion of the lung, it is detected by the physical signs with some difficulty, particularly when it is seated in the posterior and lateral parts of the organ.

59. *f.* Pneumonia may be distinguished from *bronchitis* by the crepitation being finer and more equal than that of the latter; by the blood-streaked or rusty appearance of the sputa; by the dulness on percussion as the disease proceeds, and the bronchophony and bronchial respiration. In pneumonia, also, the skin is hotter and less livid than in severe bronchitis; whilst the cough and dyspnœa are generally less urgent, and the former less paroxysmal.

60. *g.* From *pleurisy* pneumonia is to be distinguished, in the first stage, chiefly by the crepitation and sputa; and in the second and third stages, by the bronchophony and vocal vibration sensible to the hand; by the absence of the signs of displacement of the adjoining organs and of bulging of the walls of the chest; and by change of posture causing no alteration of the sound on percussion.

61. *h.* Pneumonia is sometimes not readily distinguished from the *hæmorrhagic congestion*, or from *pulmonary apoplexy*, with both which, however, as will be noticed hereafter, pneumonia is occasionally associated. It is chiefly the presence of febrile symptoms, the character of the sputum, the absence of any real hæmorrhage, the existence of crepitation, the progressive dulness on percussion, and the course of the disease, which distinguish pneumonia from these.

62. iv. Varieties and Complications of Pneumonia. — *A. Asthenic Pneumonitis,* — *Congestive Pneumonia,* — *Typhoid Pneumonia*, of various authors; — *Nervous pneumonia* of others. — In this variety of the disease, the inflammatory action assumes an asthenic form, and the attendant fever the adynamic type, owing either to original weakness of conformation, to exhaustion, or a cachectic habit of body, or to the nature of the exciting causes. Hence it is met with chiefly in persons who are weakened by exhausting influences, by insufficient or unwholesome food, or by residence in unwholesome localities and in an impure air. Owing to these circumstances, and to certain associated disorders, it has received from modern authors not only the names mentioned above, but also those of *malignant*, *putrid*, *erysipelatous*, or *bilious pneumonia.*

63. The general *character* of this form of the disease is its occurrence during previous disorder or ill-health—during a general morbid condition; in a more or less latent form, and with marked prostration of the vital energies. When pneumonia appears in the course of, or in connection with, continued or adynamic fever, influenza, erysipelas, diffuse inflammation of the cellular tissue, or phlebitis, it always assumes this form. In these circumstances, however, it appears more frequently complicated either with bronchitis or with pleuritis, or with both, than as a simple disease.

64. *a.* The *rational symptoms* of this state of pneumonia are rarely well marked. There are generally, however, a dusky hue of the countenance, slight dyspnœa, quick and short respiration, slight cough, either with or without expectoration; oppression or weight at the chest, but rarely pain, although the disease may be most extensive and dangerous, or even extend to the pleura. The constitutional affection is severe. The pulse is rapid, weak, and small. The skin is hot and dry, or covered with a clammy sweat, particularly at the extremities; the tongue is furred and brown; the bowels are costive, and the evacuations offensive; the urine high-coloured, turbid, scanty, sometimes ammoniacal; and, as the disease proceeds, low muttering delirium, coma, lividity of the lips, cold clammy extremities, &c., supervene, and the patient sinks from interruption to the functions of the lungs.

65. In this form of pneumonia the inflammatory action is characterised by the asthenic or diffusive characters pointed out in the article Inflammation (§. 54, *et seq.*), and it possesses many of the characters of active congestion. When it occurs

during continued fevers, particularly at a far advanced period of their course, it generally affects the posterior parts of the organ, and extends to both lungs. In the cachectic, and in most other complications, it is similarly extensive. The parts affected are not only engorged or hepatised, but also soft and friable, readily breaking down on pressure or exuding a dark grumous blood. The hepatisation, however, is seldom as complete as it is in the sthenic form of the disease; but is irregularly disseminated or extended through the posterior and central parts of the organ, or in points only, with marks of softening approximating the suppurative infiltration of the fourth stage, already noticed, and with films of lymph exuded upon the pleura. This partial or incomplete state of hepatisation may, however, occur in any part of the lung, but is more diffused or extended than in the sthenic form; and although one lung is generally more affected than the other, it is much less frequently limited to one lung only than in that form. It is commonly also much more rapid in its progress; and, particularly when complicated, has often advanced to an irremediable state before it has been detected.

66. *b.* The *physical signs* of this form of pneumonia are more deceptive than in the preceding. For as both lungs are generally affected, and as the disease occurs in previously debilitated or diseased persons, the patient lies on his back, either altogether in the supine posture or with his head and shoulders much elevated — this latter position being usually preserved when the bronchi are also much affected. This posture favours the congestion of the more depending portions and the inflammatory reaction in these parts, whilst the anterior, or more elevated portion of the organ, remains comparatively unaffected. Hence, the anterior parts of the chest do not evince the extent of existing mischief. In this situation but little dulness on percussion is detected, and the breathing is often distinct, although attended by sibilant or sonorous rhonchi. In the posterior, and in some degree in the lateral portions of the chest, dulness on percussion, and absence of the respiratory murmur, are always found, occasionally with a whiffing or sibillous sound. As Dr. STOKES has shown, crepitation does not always attend the early stage of this form of pneumonia, or if it occur it is of very short duration, the structural change of the part causing obstruction to the passage of air through it soon becoming complete.

67. *c.* The *terminations* of asthenic pneumonitis are: — 1st. In recovery, or restoration of the healthy state of the organ. This is, however, much less frequent than in the sthenic form; and, although the disease is formed and progresses with rapidity, its resolution is remarkably slow compared with that form; chronic hepatisation, with low hectic, or latent or more manifest congestion, continuing for several weeks. Recovery even from these states may take place under proper treatment; but, more frequently, atrophy of the lung, with or without ulceration, or other fatal changes supervene. — 2d. Fatal hepatisation or splenification — irregular, diffused, or incomplete, but more or less extensive in both lungs — takes place more frequently than any other lesion, and with great rapidity, and arrests the pulmonary functions. — 3d. A sloughing or gangrenous abscess sometimes forms, and generally destroys the patient in a very short period. — 4th. Chronic solidification of portions of the lung occasionally occurs, and commonly passes into a tubercular state.

68. Dr. STOKES observes that months may elapse before the respiratory murmur is restored, and in many cases it is never completely re-established; and, even when recovery takes place, the contraction of the chest, which usually is observed, shows the slowness with which the disease is removed. However, a more rapid recovery may occur when an acute disease of another and distant organ supervenes.

69. *B. Complications of Pneumonia.* These are more common than its pure or unassociated form, and are met with in both the sthenic and asthenic types of the disease; the latter, however, more generally presenting the complicated state. — *a. The association of bronchitis with pneumonia —broncho-pneumonitis*—is most common. Indeed, from what has been advanced above (§ 5.), it will appear evident that pneumonia, especially its most asthenic form, can hardly exist without the small bronchi becoming more or less implicated. It is, however, when the disease extends to the larger branches that this complication should be considered as existing. It is sometimes material to mark the procession of morbid phenomena in order to ascertain the primary affection. In the great majority of instances, the bronchi are primarily affected, the morbid action extending thence to the parenchyma of the lungs, owing either to the nature of the causes, to the constitution and existing state of the patient, or to the treatment adopted at the commencement. I have observed, in numerous cases, particularly among the children of the poor, living in low, damp, and close situations and rooms, sleeping in over-crowded apartments, and insufficiently or unwholesomely fed and clothed, that the disease has commenced in the bronchi, extended to the air-cells and substance of the lungs, and thence to the pleura, with great rapidity. In this complication the quantity of mucus in the bronchi may mask the crepitation of pneumonia. Still crepitation will generally be heard in the inferior and posterior regions of the chest, whilst the mucous rhonchi will be evident in the more superior parts. The rusty or tinged appearance of the sputa, as the disease proceeds, the dulness on percussion, the increased dyspnœa, the greater severity and more paroxysmal character of the cough, will also mark this association.

70. Broncho-pneumonia very frequently supervenes in the course of *influenza.* It was common, and fatal in the influenza of 1837, particularly when it implicated, as it very often did, both lungs. In this epidemic the pulmonary affection generally assumed the asthenic form, the pulse being weak, quick, and small, the cough being severe, puriform expectoration abundant, and dyspnœa distressing; and in proportion to the vital depression the most energetic means were required to rouse the vital resistance to the extension and fatal tendency of the disease. Broncho-pneumonitis is also frequent in the course of *hooping-cough*, and in the more unfavourable forms of *croup;* but, in these, it assumes a more sthenic character than in influenza. It also occurs in the course of *cardiac disease,* particularly when the valves are affected, and in connection with *hæmoptysis;* but, in these circumstances, it presents much of the congestive form.

71. The bronchitis which so very generally complicates *measles* passes very frequently into broncho-pneumonia, although the pneumonia may be the chief affection. In all cases of this association, the pulmonary disease partakes of the constitutional malady, being sthenic, asthenic, or malignant, as this latter may be. When the local disease is severe, it is readily recognised, as it is commonly attended by an imperfect evolution of the eruption, or it follows immediately upon either the premature or the regular disappearance of it; the fever or constitutional disturbance being unabated or increased.

72. The *peripneumonia notha* of several writers was frequently a broncho-pneumonia occurring in aged, cachectic, or debilitated persons, in whom the disease assumed, from these circumstances, more or less of an asthenic form, and extended to both lungs; but the same term was often also applied to other states of bronchitis, and even to asthenic pneumonia, with extension of disease to the pulmonary pleura.

73. *b. Pleuro-pneumonia— Pleuro-pneumonitis — Peripneumonia — Peripneumony* — or the association of inflammation of the substance of the lungs with that of its investing pleura, very frequently takes place. The supervention of pleuritis upon pneumonitis, or the coëtaneous occurrence of both, is attended by additional changes and phenomena to those mentioned above. Several of the alterations and symptoms described in the article PLEURA are observed when the inflammation implicates the serous membrane; but when the substance of the lungs has been for some time, or is extensively affected before the pleura is invaded, this latter is very rarely so remarkably altered as in primary pleuritis, and effusion of lymph, especially from it, very rarely takes place to so great an extent. M. LAENNEC has shown that when the inflammation has been nearly equally severe in the substance of the lung and in the pleura, the effusion from the pleura, by its pressure, modifies the effects of the inflammation in the lung; this latter being often found after death more consolidated, and tougher and redder, than in ordinary hepatisation, and devoid of the granular texture. Its resemblance in such cases to the muscular substance induced M. LAENNEC to call this state that of *carnification*. In this complication, the effusion of lymph into the air-cells is probably prevented; hence the granular appearance is not produced, the lymph being effused external to the cells, or in the connecting cellular tissue. In many, at least, of these cases, wherein the carnification is most complete, I believe that the inflammation originates in the pleura, or in its subjacent cellular tissue, and extends through the medium of this latter tissue to the subjacent structure of the lung; and this is rendered the more probable by the amount of effusion, which is generally great where the carnification is complete. In such cases the progress of inflammation is much less rapid, and the lesion of the lung rarely proceeds so far as the *fourth* stage, or that of suppurative infiltration or softening. If the pleura is covered with a false membrane, the contraction and solidification of this, as the disease continues or becomes chronic, binds down and compresses the subjacent pulmonic structure, rendering it still more dense, and obliterating, more or less permanently, the air-cells of the part. The consequence of this change is, as somewhat too strongly insisted upon by Dr. WILLIAMS, that the chest remains to a certain degree contracted, as after pleurisy, when the liquid effusion is removed by absorption; the obliterated air-cells no longer admitting the air. But in some of these cases the lymph obstructing the cells is gradually absorbed, and the parts are partially restored to their former state. When, however, such restoration is not effected, the air not reaching the cells often dilates the bronchi, this dilatation taking place in various grades; dilatation of the bronchi thus following pleuro-pneumony in its more chronic states.

74. As respects the *pleura* in these cases, the changes which take place consist chiefly — 1st. Of effusion of lymph; — 2d. Of effusion of a sero-puriform fluid; — and 3d. Of the effusion of air, or gaseous fluid. The *first* is almost constant, although it may occur to a very slight extent, when the substance of the lung is extensively, deeply, and primarily affected. The *second* is comparatively rare in pleuro-pneumonia; and the *third* is very rare indeed, although it may take place in this complication of pneumonia, as in primary pleuritis, especially in the more asthenic cases.

75. The *symptoms* of pleuro-pneumonia are not materially different from those of simple pneumonia, unless much effusion takes place from the affected pleura. When this membrane is consecutively or slightly affected, pain may not be severely felt. Indeed this complication is generally not so severe or acute as either simple pneumonitis or primary pleuritis; and the symptoms are very often more obscure than those of either. When lymph is effused on the pleura, it does not necessarily induce corresponding physical signs; hence the *frottement* of LAENNEC is not a common sign of pleuro-pneumonia, and is rarely observed in the advanced stages, or at the resolution of the disease. It is observed chiefly in the early stages of some cases of extensive pleuro-pneumonia. At first, crepitation may be heard; but it becomes indistinct as effusion from the pleura takes place and is considerable. Dulness on percussion is greater than in pneumonia, especially in the lower parts of the affected side. As Dr. WILLIAMS states, bronchial respiration and bronchophony are soon produced, in the central regions of the chest, by the condensed lung being pushed against the walls; and if a thin layer of liquid intervene, the bronchophony acquires a buzzing accompaniment, the sound seeming to consist of two voices; this probably arising from the vibrations being modified into a buzzing or bleating by passing through the thin layer of liquid. The vocal resonance is generally louder in pleuro-pneumonia than in either simple pneumonia or pleurisy, owing to the greater condensation of the vesicular structure, and to the closer application of the inflamed lung to the walls of the chest — circumstances also which explain the occasional appearance of the tracheal or amphoric sound on percussion in the mammary region, whilst other parts are dull. In cases inefficiently treated at their commencement, and become chronic, solidification of a portion of the lung having become permanent, and the fluid effused from the surface of the pleura having been in great measure absorbed, respiration is often quite tracheal in this

region, and resonance of the voice as loud as that of cavities, especially if dilatation of the bronchi have taken place, as frequently occurs, in these circumstances.

76. *c.* During the course of *tubercular disease* of the lungs pneumonia often occurs; and is either partial or limited, or more less extended, especially in one lung. Inattention to this fact, and the consequent non-detection of the superinduced inflammation, in such cases, are often the causes of their more rapidly unfavourable termination. Either simple pneumonitis, or pleuro-pneumonitis, or even still more frequently broncho-pneumonitis, may thus supervene; and the great frequency of their occurrence should induce the physician to watch for them, and to combat them on their first appearance.

77. *d.* When treating of *hæmorrhage from the lungs* (§ 114.), I remarked upon the frequent connection of this pathological condition with inflammation of some portion of the organ. It is not unusual for active congestion of the lungs to give rise to slight or even copious hæmorrhage, and then pass on either to simple pneumonia, or to broncho-pneumonia. Generally this occurrence is connected with tubercles, this latter being the primary malady; but, in many, the consequent inflammation is more immediately dependent upon the hæmorrhage and congestion than upon the tubercular disease; and this is more especially the case when hæmorrhage takes place in the form of pulmonary apoplexy. Whenever, therefore, hæmoptysis occurs, partial or more general pneumonia or broncho-pneumonia should be suspected, and its existence or non-existence ascertained by a careful examination.

78. *e.* The *absorption of puriform or other morbid secretions* into the blood, and *phlebitis* occurring either after parturition, or after surgical operations or injuries or wounds, are not infrequent causes of pneumonia of a peculiar, insidious, and latent kind, which sometimes does not manifest itself until shortly before death; and then chiefly by oppressed, quick, and short breathing, and mucous rattle. In some of these cases, portions only of the lungs are found inflamed in the first and second stages; in others, there are numerous circumscribed hepatisations, varying somewhat in their characters; and in several, purulent deposits are met with in the parenchyma of the organ; these deposits being circumscribed, and the tissue surrounding them either inflamed or almost healthy. These are, however, to be viewed as infiltrations of puriform or other morbid secretions into the pulmonary tissue, inducing asthenic inflammatory action in the parts with which they come in contact and contaminate; and, perhaps, in some situations, as asthenic inflammation of the more extreme capillaries through which these secretions circulate, the capillaries of mucous and cellular parts being most prone to be affected by them. Those small abscesses, or deposits, which are more obviously instances of puriform infiltration, present the matter in contact with, and infiltrating the margins of, the surrounding tissue, which is hardly or not at all inflamed; whilst those which are manifestly connected with inflammatory action present a red or livid margin, with a more or less distinct coat of lymph in some instances, but only in those in which this action approached the nearest to the sthenic form. These consecutive abscesses or deposits are more particularly noticed in the art. ABSCESS (§ 27. *et seq.*) and LIVER (§ 208. *et seq.*).

79. *f. A complicated and congestive form of Pneumonia* — complicated most frequently with bronchitis — is often consequent upon eruptive fevers, upon cholera asphyxia, or pestilential cholera, and upon asphyxia from whatever cause, and especially when produced by foul exhalations. It sometimes also occurs in the course of continued endemic, remittent, and intermittent fevers. In all these circumstances, the pneumonia is generally more or less asthenic and obscure, or even latent, sometimes not manifesting itself until shortly before death, or before the lungs had become extensively impervious to the air, or even not until it is detected after death.

80. v. CAUSES OF PNEUMONIA.—Inflammation of the substance of the lungs, in some one of its forms or states — in a sthenic, asthenic, congestive, malignant, or complicated form, according to the nature and association of the exciting causes, and the state of constitution and predisposition of the individual — is a frequent disease, especially in cold and temperate or variable climates. — *A. Childhood* and far advanced *age*; the sanguine temperament, and the weak or scrofulous diathesis, are most *predisposed* to pneumonia. *Infants* and *children*[*] are especially predisposed to this disease, which, in its several forms and complications, destroys more of them than all other inflammatory diseases. Debility from whatever cause, whether original or from previous disease, remarkably predisposes to pneumonitis. The eruptive fevers, especially measles, hooping-cough, and previous attacks of either pneumonia, bronchitis, or pleuritis, exert a similar influence, as I have shown under these heads. The greater disposition of pneumonia to occur during *gastric* and *bilious* disorder, especially at certain seasons, as the autumnal, and in cachectic states of the frame, have induced some authors to notice varieties of pneumonia by these appellations. But these are not varieties, but merely contingent associations of the disease with, or appearances of it during, these states of previous disorder.

81. *B.* Cold, or whatever favours or produces congestion of the lungs, *excites* an attack of pneumonia; and the readiness with which it operates is generally in proportion to the susceptibility and excitability of the individual, and to the impairment of vital resistance. If exposure to cold be so long continued, or if the degree of cold be so great, relatively to the state of vital energy and resistance, as to cause vital depression and congestion of the lungs, reaction will generally follow, unless the depression be so great as to overcome or altogether annihilate the powers of vital

---

[*] The remarkable *prevalence* and *fatality of pneumonia among infants and children* are shown by the returns to the Registrar General.

1. In *Manchester*, in 1839, of 501 deaths from pneumonia, 213 were infants in the first year, 156 in the second year, and 44 in the third year of age.

2. In *Liverpool*, of 657 deaths from pneumonia in 1839, 216 were infants in the first year, 212 in the second year, and 68 in the third year of age.

3. In *Birmingham*, of 395 deaths from pneumonia in 1839, 160 were in the first year, 136 in the second year, and 26 in the third year of age.

In persons far advanced in age, asthenic and complicated pneumonia becomes somewhat more prevalent than at middle age, and very much more fatal.

resistance and vascular reaction. All noxious agents affect the lungs more severely and certainly when the constitutional powers are weakened, or the spirits depressed, and when the body is in a state of repose or asleep, than in other circumstances; and this is especially the case in respect of the influence of cold. When sufficient exercise can be taken to preserve the circulation in a state of activity, cold is seldom injurious; but as soon as repose or sleep takes place congestion supervenes, particularly in the lungs, and the congestion may go on to asphyxia or vital extinction, if the cause continue to operate or to increase; whilst it may be converted into inflammation if the cause be suddenly removed, or if exciting or other agents be brought into operation, which tend to develope vital reaction. Owing to this and other causes, pneumonia is most frequent in winter, autumn, and spring, and most common in those classes of the community which are most exposed to cold in any form, or to vicissitudes of climate, season, weather, and temperature, especially sailors and soldiers, coachmen and grooms, day-labourers, firemen, &c. It is more prevalent in males than in females, owing to these circumstances; but, according to the returns to the Registrar General, &c., not so much more so than is generally stated, the deaths of males from pneumonia compared with those of females being as 10 to 8.

82. Inhalations of acrid, chemical, and other noxious gases; public speaking, and all exertions of the voice; the use of wind instruments; concussions of the chest; prolonged swimming, or immersion in water; and removal into a very warm air after prolonged exposure to cold, and particularly to atmospheric cold—are powerful exciting causes of the disease. Other maladies not only predispose to, but often excite an attack of simple or complicated pneumonia, but more frequently the latter, in either a sthenic or asthenic form, and either during their progress or upon convalescence from them. This is especially the case in respect of eruptive and continued fevers; of hooping-cough, bronchitis, and pleuritis; of diseases of the heart; and of croup and laryngitis. The greater liability of pneumonia to occur after the disappearance of cutaneous eruptions, or upon the sudden cessation of an attack of gout or of rheumatism, has been noticed by most writers; but much more importance has been attached to this cause than it deserves, for pneumonia is very rarely produced by it.

83. The incautious exposure to cold or wet, and to the night air, after breathing for some time the foul and depressing air of a confined or crowded apartment, or ill-ventilated quarter, bed-room, or barrack-room, is perhaps the most productive cause of pneumonia, particularly in large towns, and in armies and fleets, and explains the greater prevalence and mortality of the disease in these circumstances than in open healthy localities.

84. C. The *endemic* and *epidemic* prevalence of pneumonia has been admitted by most writers. — *a.* It is sometimes *endemic* in elevated, cold, and dry localities, either in its simple form, or in connection with pleurisy — as a pleuro-pneumony. It is also prevalent in low, cold, and humid situations, but less so than in the foregoing places, and is most commonly associated with bronchitis — as a broncho-pneumonia. Although pneumonia prevails chiefly in cold countries, yet it is often observed in the more temperate climates of the south of Europe, especially where cold northerly winds blow from high ranges of mountains. In both Milan and Madrid pneumonia is very prevalent. Acerbi states that, in the hospital of the former city, there were 142 cases of it out of 175 patients. It is also said to be prevalent in the vicinity of Vesuvius, probably owing to acrid or otherwise noxious exhalations or gases from that volcano. Mr. Farr has shown, in his tables of mortality, drawn up from the returns made to the Registrar General, that the deaths from pneumonia in *cities* and *large towns* in England are much more numerous than in the same amount of population in *country districts* — are so much so as to indicate both a greater prevalence of the disease, and a greater rate of mortality from it, in the former that in the latter.*

85. *b. Epidemic* pneumonia has been described by many authors. As a complication of influenza, pneumonia of an asthenic form, and broncho-pneumonia, may be said to have been epidemic at the commencement of 1837. When this disease is epidemic, it is most frequently asthenic. It is not infrequently also epidemic amongst horses and cattle. Laennec attributed the epidemic occurrence of pneumonia to deleterious miasms in the atmosphere; and others have imputed it to swarms of minute insects in the air — a subject of much importance, and most ably considered by Dr. Holland, in the chapter "On the Hypothesis of Insect Life as a Cause of Disease." (*Medical Notes and Reflections*, p. 560.) Although changes in the temperature, in the hygrometrical state, in the weight or density, and in the electricity of the atmosphere, may account for the increased prevalence and varied forms of this and of many other diseases, still they are insufficient of themselves to cause the more devastating epidemics sometimes observed, and, as respects this disease, most remarkably amongst some of the lower animals. Even when occurring epidemically, situation, weather, and seasons †

---

* 1. The *deaths* from pneumonia, registered in the *metropolis* for 1838 and 1839, were 3954 males and 3477 females — total 7431.

The *deaths* from this disease in about the same amount of population in the *counties* of Cornwall, Devonshire, Dorsetshire, Somersetshire, and Wiltshire, during these two years, were 1888 males and 1558 females — total 3446, or less than one half the deaths from pneumonia in the metropolis.

2. The *deaths* from pneumonia in 1838 and 1839, in *twenty-four town districts*, including the metropolis, were 8188 males and 6874 females — total 15,062.

The *deaths* from this disease in the same two years in *twelve country districts*, containing about the same amount of population as the town districts, were 3392 males and 2826 females — total 6218, or in the proportion of about 3 to 7½.

3. The *deaths* from pneumonia in the *metropolis*, in 1839, were 1949 males and 1738 females — total 3687.

The number of *deaths* in 1839, in *England and Wales*, were 10,000 males and 8151 females — total 18,151.

† Number of *deaths* from pneumonia registered in the *metropolis* during the *four quarters* of 1838, 1839, and 1840.

1. During January, February, and March: 271 days — 3326.

2. During April, May, and June: 273 days — 2454.

3. During July, August, and September: 275 days — 1827.

4. During October, November, and December: 275 days — 3600. The greatest number, and nearly double that of the preceding three months, in which the number is least.

From these data, pneumonia appears to be most pre-

materially influence its characters and prevalence. Thus HUXHAM states, that during an epidemic it assumed more of the bronchitic character in low and humid places, and most of the pleuritic form in dry and elevated situations. (See articles ENDEMIC and EPIDEMIC INFLUENCES.)

86. vi. TERMINATIONS, DURATION, AND PROGNOSIS. — *A.* The chief *Terminations* of pneumonia have been noticed when describing the usual course of the disease. But in addition to these it may be stated, that the supervention of *pleuritis* with very copious effusion may supersede or resolve the inflammation of the substance of the organ, that of the pleura and its consequences becoming the chief or only lesion. This is, however, comparatively rare. Much more frequently the acute attack of pneumonia subsides or is subdued, and the patient continues short-breathed and feverish. The pulse remains quick, and dulness or crepitation is still detected in parts of the chest, with more or less uneasiness. Chronic hepatisation of portions of the lungs thus not infrequently follows neglected or improperly treated pneumonia, or premature exposure or neglect during convalescence, especially amongst soldiers and sailors, or the poor, who are exposed to vicissitudes of weather. It is not improbable that tubercular disease of the lungs may originate in these states of chronic pneumonia, especially after repeated attacks, or exacerbations of the local changes, as supposed by MM. BROUSSAIS and ANDRAL; and when occurring in scrofulous constitutions. It is not unlikely, however, that many of the cases in which the inflammation has been supposed to lapse into the chronic state, and to give rise to tubercles, have been tubercular from the commencement, the pneumonia being merely an intercurrent disease, which has more rapidly developed the tubercular formations; and these have tended to keep up a state of chronic inflammatory action with more or less engorgement or solidification of the lung; for pneumonia very rarely degenerates into a chronic state, unless in connection with tubercles or hæmoptysis, a circumstance which probably induced BOUILLAUD to infer that tubercular formations in the lungs is merely a chronic form of inflammation of them.

87. *B.* The *duration* of pneumonia is very indefinite, and varies with the age of the patient, with the state of vital action characterising the inflammation, with the complications and the treatment adopted. In general the asthenic states are more rapid in their progress than the sthenic; and the complications of the disease with exanthematous or other fevers, or the occurrence of it during early convalescence from these, not only accelerates the progress, but increases the danger from it. Debility and advanced age also accelerate its course. In some instances of its occurrence in these circumstances it may run its course in from thirty-six to forty-eight hours, or even in a somewhat shorter period. M. LAENNEC attempted to assign periods to the different stages of the disease; but these can be viewed as approximations only to the truth, which numerous causes may vary, more particularly the violence of the attack, and the circumstances just adverted to. He states that the average duration of the stage of *engorgement* is from twelve hours to three days; of the stage of *hepatisation* from one to three days; and of the stage of *supperative infiltration* from two to six. Remedies which retard the progress of the disease may, however, prolong the duration of the first two stages beyond the periods here assigned; these varying most remarkably with the treatment and peculiarities of the case: and, as contended for above, the stage previous to hepatisation is more important, and of longer duration, especially in children and young subjects, than M. LAENNEC appears to think.

88. *C.* The *prognosis* is, equally with the duration of the disease, dependent upon numerous circumstances, and more particularly upon those just named (§ 87.). Pneumonia, in all its forms, but more particularly its asthenic and complicated states, and when epidemic, is a very serious malady, requiring a cautious prognosis even in the more favourable cases; for these may superinduce a most dangerous pleuritis, or become otherwise aggravated in their progress; or a relapse of a most dangerous kind may occur during early convalescence from them. The "numerical method" of estimating the danger has been extended to pneumonia as well as to other diseases by several French pathologists, as well as by a few British writers. But it must be obvious, on reflection, that the danger and rate of mortality must necessarily vary with the situation and climate; with the prevailing epidemic; with the age, constitution, and other circumstances of the patient; and with the severity, stage, and complications of the malady. Hence the mortality from this disease has been differently estimated; and, amongst soldiers during service, amongst the poor, the ill-fed and ill-clothed, amongst persons engaged in crowded or over-heated or ill-ventilated factories, and in other unfavourable circumstances, it is generally high. Dr. MANN states, that during the last war in the United States of North America, pneumonia was both very prevalent and very fatal. Sir J. MAC GRIGOR states that the disease was prevalent among the troops in Spain during the last war, and that it often assumed an insidious, latent, or low form. The disease, however, does not appear to have been very violent or fatal; for of 4027 cases entered as pneumonia, only 285 died, or rather less than 1 in 14. The treatment of it appears to have been energetic, early, and judicious. In some of the hospitals in Paris the mortality has varied from two fifths to one tenth. The loss is still greater than the highest of these rates amongst the aged.

89. The danger from an attack of pneumonia is remarkably increased by previous ill health, or attacks of pulmonary disease; by preceding eruptive fevers; and by original debility of constitution. Although recovery may take place from any stage of the disease, the chances diminish rapidly with the supervention of the advanced stages, and become very few after suppurative infiltration takes place. The very rare occurrence of gangrene or abscess is a most dangerous, but not hopeless event. A violent attack, a great extent of the disease, and particularly the implication of both lungs, and its complications with double bronchitis; the affection of the upper lobes and roots

---

valent and fatal during the cold and humid weather following the *third* three months of the year. This agrees with my observation in respect of children.

of the organ; the operation of causes of a depressing and contaminating nature, as foul air, and partial asphyxia from foul exhalations; the occurrence of the disease during influenza and eruptive fevers, during the puerperal states, and after prolonged suckling; all the more severe complications noticed above, and the progressive advance of the disease notwithstanding early and judicious treatment,—are extremely unfavourable circumstances.

90. The symptoms more particularly evincing danger are those indicating the progress of the disease to suppurative infiltration of the lungs, or even to extensive hepatisation; very quick and short breathing; frequent dilatations or a working of the alæ nasi; a feeling of a want of breath, rather than of difficulty of breathing; delirium or restlessness; a rusty or prune-juice appearance of the sputa; cold sweats; anxiety, and sharpened pale features, with lividity of the lips and tongue, and the other symptoms noticed above (§§ 21. 55.).

91. vii. TREATMENT.—The treatment of pneumonia should be conducted with strict reference — 1st. To its stages; — 2d. To the states of vital action and power; — and 3d. To the complications and peculiarities of each case. To each of these circumstances the *indications of cure* should be individually appropriate.

92. *A. Treatment of Sthenic Pneumonia.* — *a.* In the *first* and *second stages,* or those of incipient inflammatory action and engorgement — the *first stage* of LAENNEC (§ 49—51.)—the disease may be much shortened, if not altogether arrested, by energetic means. This, therefore, should be the *first* and *chief intention.* — *a.* If, at this period, the local and constitutional symptoms and appearance of the patient indicate sthenic reaction either commencing or established, a large *blood-letting* ought to be immediately practised; and the blood should be abstracted in a full stream, and until a marked impression is made upon the pulse, whilst the patient is in a sitting or semi-recumbent posture, as directed in the article BLOOD (§ 64.): but, for the reasons there stated, and since adopted by the ablest writers and practitioners, it should not be carried so far as to produce full syncope. In the young and robust, and where there is evidence of unimpaired constitutional power, blood-letting may be resorted to as early as any signs of inflammatory action can be detected, if it be performed in the way I have advised. This having been performed with the effect just mentioned, means should be prescribed to prevent the return or increase of the vascular reaction; and with this view I have, for many years, directed, immediately after the blood-letting, from 5 to 15 or 20 grains of calomel, with from 3 to 5 of James's powder, and from 1 to 3 of opium, to be taken at one dose: saline diaphoretics, with antimony, more particularly the liquor ammoniæ acetatis and liq. antimonii tart., in full doses, with the spiritus ætheris nitrici, in camphor-water, being given every three or four hours. In many cases, this prompt and large blood-letting will arrest the further progress of the disease, and in all tend remarkably to shorten it.

93. The patient ought to be seen again in about eight or ten hours, or twelve at the furthest; and if the symptoms are not abated, or if they have become exacerbated, and if vascular reaction from the state to which it had been reduced by the blood-letting have taken place, the pulse having increased in strength, venesection must again be resorted to, if the patient be robust or plethoric, and blood abstracted so as to affect the pulse and system as before, and in the manner already advised, and it should be instantly followed by the exhibition of the same medicines which I have recommended above (§ 92.) after the first bleeding. In many cases, as in the less robust or plethoric, or where the increase or return of the vascular action is slight or hardly manifest, or where there is merely a persistence of the morbid action, either in the same or in a decreasing degree, local depletion by cupping or leeches, or by cupping over the leech-bites, will be adopted with advantage; the amount of local depletion having reference to the circumstances of each case. The chief advantages of this plan, which I have long pursued in this and in other sthenic inflammations, is, that the means employed immediately after a full blood-letting are such as will promote all the effects which it is calculated to produce, and as will prevent a return of the vascular excitement, which is prone to return as long as the local morbid action continues, and even after it is subdued, when the blood-letting has been copious.

94. The practice of prompt and copious vascular depletions, so very generally and long observed in this country, has been recently adopted by M. BOUILLAUD and a few others in France, and with the success which has followed it in this country, although it has been decried by M. LOUIS, who has adduced his "numerical method" in proof of the little benefit produced by it. But, as I have elsewhere contended, this method is a delusion, unsupported by that best of all tests of medical doctrine, common sense; for it must be manifest that if a mode of treatment be empirically followed in all cases said to be nosologically the same, although different or even opposite as respects vital power, complication, and stage of advancement, it must be injurious almost as frequently as beneficial. The quantity of blood abstracted by M. BOUILLAUD is certainly large, but not larger than has usually been taken in this disease by public and private practitioners.

95. It is unprofitable to follow the French physicians in their arguments on this question, as some of our recent philo-Gallic writers have done; as their lucubrations tend only to overlay a plain common-sense view of the subject with a load of flat, stale, and inapplicable numerical — vainly called statistical—details. From what I have advanced it may be inferred, that nothing can be said with propriety as to the precise amount to which blood-letting should be carried in this, more than in any other inflammation. It should be practised so as to make a full impression upon the pulse and system, and with but little reference to the quantity. I have taken as much as fifty-four ounces at one time, in the manner I have advised, from a strong plethoric man, the early stage having been fully developed, and vascular reaction being energetic; and, having had recourse to the additional means above mentioned (§ 92.), no further blood-letting was required. In similar circumstances, I have not infrequently had from forty to fifty ounces taken at the first venesection, and with the same result. In this, as well as in other inflam-

mations, although vascular depletion is the chief remedy, it ought not to be the only one. It should be aided by other means. What these means are I have already partly indicated; but they require to be noticed more in detail, for the chief of them have been individually lauded with all the zeal which partisanship generates, and with all the exclusiveness which a one-sided view or an adopted doctrine never fails to produce.

96. *b. Tartarised antimony* has been long employed in emetic and nauseating doses in the treatment of pneumonia; and, independently of these effects, by Dr. MARRYATT, and more recently by Dr. BALFOUR. RASSORI of Genoa, however, first demonstrated the great extent to which this substance might be prescribed for inflammatory diseases; and LAENNEC more especially elucidated its effects in the treatment of pneumonia, but, in estimating it above blood-letting in this disease, rated it much too highly. He gave this medicine in doses of from one to two and a half grains in three ounces of a sweetened weak infusion of orange leaves, withholding it after the sixth dose, or persevering in it according to the violence of the attack. It was chiefly to this remedy that he attributed the great success of his treatment, which he rated as high as two deaths only in 57 cases — a success, however, which has not been attained by other practitioners, who have used this substance. Since 1819 I have given it an extensive trial in pneumonia, chiefly in dispensary practice; and, although I do not think so highly of its efficacy as LAENNEC, I believe it to be a valuable remedy, but subsidiary only to blood-letting, and appropriate chiefly to the *first stage* of the disease. It is by no means a safe medicine for young *children* or *infants;* for I have seen large doses of it, particularly when too often repeated or continued too long, produce most dangerous and even fatal collapse, which was sometimes mistaken for the unfavourable course of the disease. In this class of patients, therefore, it should be given with caution, and its effects ought to be carefully watched. For adults it may be prescribed, after sufficient blood-letting, in doses of from half a grain to two grains in any agreeable vehicle, and repeated every two, three, four, or five hours, according to the severity of the disease; but I have found it equally beneficial in smaller doses, when conjoined with the other medicines noticed above in connection with it (§ 92.). The first doses usually cause vomiting, which ceases after the second, third, or fourth; and which should be arrested, if it continue after the second or third, by one or two doses of hydrocyanic acid. If it produce purging, a few drops of laudanum, or the syrup of poppies, should be given with it. Tartar emetic, when given in large and repeated doses, operates chiefly upon the organic nervous energy and the vascular action, lowering both, or the latter chiefly through the medium of the former, in a very remarkable manner, when neither of them are much excited; but much less manifestly when either, or both, are greatly increased.

97. *c. Mercury with opium*, in large doses, has been much employed, both with and after blood-letting; and calomel, in doses of from 5 to 20 grains, is the preparation which is most to be preferred. If the bowels have not been sufficiently evacuated, the first dose of it may be given without the opium, with four or five of JAMES's powder, or with one or two of the extract of colchicum, or even with both; but when the bowels are free from fæcal accumulations, from one to three grains of opium should be combined with these, and given immediately after the first blood-letting, as noticed above (§ 92.). The doses of these, and frequency of exhibiting them, should be regulated according to the severity and progress of the attack, and the circumstances of individual cases; but they should be persisted in until the gums are affected, or the disease is arrested. In children very generally, and in adults not infrequently, the disease will be either much mitigated, or altogether arrested, before the effect upon the mouth is produced by the mercury. The application of the mercurial ointment to a blistered surface, and rubbing it on the insides of the thighs and armpits, have been likewise recommended; but the exhibition of calomel internally, particularly with the remedies here advised, is much more efficacious; these remedies accelerating the operation, and securing or promoting the beneficial effects, of the calomel upon the local disease, as well as upon the constitutional disturbances. In some cases, the hydrargyrum cum cretâ may be given, particularly when the bowels are irritable, with opium and ipecacuanha; but it is not so entirely to be depended upon as the calomel.

98. The good effects of calomel, prescribed as now advised, are less immediate than those of tartarised antimony, but more certain and permanent; it should, therefore, be preferred, particularly when the disease is advancing to, or has far advanced in, the stage of hepatisation. It is also a much safer treatment for children than that by antimony in aid of blood-letting; but for them, JAMES's powder or ipecacuanha should be given with it, in preference to other medicines, and opium should be omitted, unless the child is several years of age. The great advantages of this treatment are its influence in lowering local and general vascular excitement; in relaxing the cutaneous surface, and equalising the circulation; in preventing the effusion of lymph, and in promoting the absorption of whatever may have been already effused.

99. *d.* In the early stages of pneumonia, venesection, as above advised, local bleeding according to circumstances, tartar emetic, mercury, &c., are the means which ought to be depended upon. Other remedies may, however, be employed, either in aid of these, or with a view of preventing a return of the inflammation. *Blisters* and other *external derivants* should be employed only after the treatment advised above has been carried sufficiently far, when they will aid in removing existing congestion. *Purgatives* are not of much service; still the biliary and other secretions should be promoted, and the bowels duly evacuated — ends which the means already recommended will seldom fail to accomplish. *Diaphoretics* and *diuretics* should be viewed as adjuvants merely, and are but little required where either the tartar emetic or the mercurial treatment has been prescribed with due activity. Of these medicines, the liquor ammoniæ acetatis, the spiritus æth. nitrici, and ipecacuanha are the most beneficial, and are generally valuable adjuncts to the more energetic means previously mentioned. *Expectorants* are seldom required in

the earlier stages of sthenic pneumonia, not even after the inflammatory action is removed, unless in old persons, or when the treatment has occasioned considerable exhaustion, and is followed by a difficult expectoration. They should be employed with caution, or they may favour a relapse. The decoctum senegæ, camphor, and ipecacuanha, should be preferred; squills and ammoniacum should be prescribed only in small doses. In this stage too much should not be attempted by expectorants. Nature will generally perform her own work the best, when not impatiently driven. If she require aid, the means just named, blisters, or the embrocations hereafter to be noticed (§ 110.), will be sufficient. A recourse to other *sedatives* than the opium, in the manner above advised (§ 97.), is seldom either required or beneficial.

100. *e.* In the *third stage*—the *second* of LAENNEC — when solidification has taken place, or is far advanced or extensive, the chief *intentions* are, to procure the absorption of the effused matter, to remove the attendant engorgement, and prevent the extension of irritation or inflammatory action around the hepatised part. Blood-letting is now no longer of service, unless it has been previously neglected or very insufficiently practised, and the patient is still plethoric; the veins evincing considerable fulness, and the pulse much power. A general or local bleeding, or both, may be cautiously employed in these latter circumstances, particularly if crepitation be still heard in any part of the lung; but the chief dependence should be placed upon *calomel* and *opium*, which may be conjoined with colchicum or JAMES's powder, or with digitalis, according to the peculiarities of the case. When this stage becomes advanced, or has continued for some time, blisters, rubefacient embrocations (§ 110.), and salines, with mild expectorants, digitalis, camphor, &c., according to the state of the pulse and the presence of fever, are often beneficial. In this stage of the disease the decoction of *senega*, in small or moderate doses, with orange-flower water, and full doses of the *liquor potassæ*, or the liquor ammoniæ acetatis, with the ammonia in excess, or with camphor, and spirits of nitric æther, or either of these with digitalis and small doses of squills, are the most appropriate medicines. When there is much cough or irritation, *alkalies*, particularly the liquor potassæ, should be given freely with sedatives, especially opium or henbane; or the *hydrocyanic acid* may be prescribed with *demulcents* and *diaphoretics*. When fever is removed, but the lung still remains partially hepatised or much engorged, I have found small doses of the *iodide of potassium*, with the liquor potassæ, in a weak decoction of senega, or with sarsaparilla, of great service; frequent recourse being also had to blisters, or to rubefacient embrocations on the chest. If the vital energies become much depressed in the course of this stage, our chief reliance should be placed upon full doses of camphor, or of ammonia, with the decoction of senega, upon stimulant embrocations on the chest, and the other means advised for the next stage.

101. *f.* In the *fourth stage*—the *third* of LAENNEC — or that of suppurative infiltration (§ 55.)— the chief *indication* is to support the powers of life, in order to enable them to resist the extension of mischief, and to repair that which has been done. This, however, cannot frequently be accomplished, but it ought always to be attempted; for well-directed efforts will sometimes succeed in procuring the expectoration of whatever puriform matter may pass into the small bronchi, or in limiting the extension of the suppurative infiltration, and subsequently in procuring its absorption and the repair of the lesions which have been produced. The means with which these efforts should be made must be varied with circumstances; but camphor, assafœtida, ammoniacum, squills (pilula scillæ comp.), senega, ammonia, musk, myrrh, sarsaparilla, iodide of potassium, the mistura ferri composita, liquor potassæ, may severally be prescribed, in various forms or combinations, according to the peculiarities of the case; and aided by stimulating embrocations applied to the chest (§ 110.)

102. *g.* If *abscess* occur in this stage, the treatment need hardly be varied from that just advised; but the state of the pulse, the expectoration, the state of vital power, and the physical signs should guide the physician. When the symptoms of *gangrene* (§§ 44. 56.) appear, the treatment should depend much upon the state of vascular action and vital power attending it. In most cases, quinine, with camphor and opium or henbane, or the decoction of bark with soda and ammonia, and inhalation of the vapour of creasote, are more or less serviceable. If vascular action still continue much excited, and vital power not materially impaired, local depletions, especially by cupping, may be prescribed, even whilst the tonic and antiseptic means just mentioned are being employed. Dr. STOKES prescribed, in these cases, the chloride of lime with opium, as an antiseptic; and Dr. WILLIAMS the nitro-muriatic acid. I prefer camphor in full or large doses, conjoined with the other substances just mentioned, or with expectorants and alkaline carbonates. LAENNEC advised quinine or chinchona, either of which may be given with the camphor as above.

103. *h.* There are *various circumstances*, some of them only of occasional occurrence, which require attention during the treatment of pneumonia.—*a.* A *female* may be seized with pneumonia without the catamenia disappearing, or they may appear early in the attack; but this occurrence is not to paralyse the treatment; for, unless this discharge occur at an advanced stage, or after active means have been employed, and unless it be attended by marked abatement of the disease, blood-letting, general or local, or both, should be adopted, according to the circumstances of the case.

104. *b.* The occurrence of *delirium* during pneumonia, a circumstance long and justly considered as very unfavourable, and as generally precluding blood-letting, ought not always to forbid a recourse to this treatment, particularly if the delirium occur only in the night. In several instances I have prescribed venesection with marked benefit, although this symptom was present, the other symptoms indicating the propriety of it. Two of these were persons between seventy and eighty years of age, and in one of them venesection was twice performed. They both quickly and perfectly recovered.

105. *c.* In persons far advanced in age, in those addicted to the excessive use of spirituous liquors, in the ill-fed and badly clothed, in females during the puerperal states, blood-letting is often but ill tolerated; and it should, therefore, be resorted to

with caution. In many of these cases even a moderate sanguineous depletion is followed by increased oppression, collapse, and extended congestion and infiltration of the lungs. For these the treatment recommended for the *asthenic disease* (§ 109.) should be immediately adopted; and camphor, the balsams, senega, assafœtida, musk, ammoniacum, squills, &c., ought to be prescribed in such forms and combinations as the peculiarities of the case may suggest, and be aided by rubefacient embrocations, blisters, &c. In the cases of persons addicted to drunkenness or to the excessive use of spirituous liquors, due regard to these habits should be had during the treatment, especially in the advanced stages of the disease.

106. Calomel and opium were first recommended by Dr. Hamilton of Lyme Regis, and subsequently by Reil, Thomann, Wright, Vogel, Hufeland, Schmidtmann, and several contemporary writers. In severe sthenic cases it will be often preferable to combine them with the tartarised antimony, or to give them in much larger doses and at longer intervals, and the tartar emetic during the intervals, commencing with them immediately after the first bleeding, as advised above (§ 92.).

No. 287. ℞ Hydrarg. Chloridi ʒss.; Antimonii Potassio-tart. gr. iij.; Pulveris Opii puri. gr. v.; Confect. Rosæ, q. s. M. Fiant Pilulæ viij.; quarum capiat duas 4tis, 5tis, vel 6tis horis.

107. No dependence can be placed upon the plan of giving a large dose of opium alone after the first blood-letting, as recommended by Thilenius, Kortum, Horn, and Michaëlis, and more recently advised by Dr. Armstrong. Other preparations of opium, as the acetate or muriate of morphia, the bi-meconate of morphia, or the liquor opii sedativus, may be used instead of the pure opium, or the watery extract; but they should be given either with calomel, or with antimony, or ipecacuanha, in order to secure a beneficial effect in this disease.

108. As long as the pulse continues hard or sharp, the tongue dry, and the skin hot and unperspirable, the heating expectorants ought not to be prescribed, nor should blisters be applied. These symptoms, however, do not preclude having recourse to the turpentine embrocation, which may be applied over the chest in the manner about to be described (§ 110.); and which generally, especially when employed in aid of the treatment by calomel and opium, or by antimony, or by both conjoined, reduces the frequency and force of the heart's action, and promotes a copious perspiration.

109. *B. Treatment of asthenic Pneumonia* (§ 62.). This form of the disease seldom admits of more than *local vascular depletions*, and even these should be prescribed with caution. Where they cannot be employed, *dry cupping* on the chest or between the shoulders, as suggested by Celsus, may be substituted for them. *Camphor* is one of the most valuable remedies that can be given in this form of pneumonia. It was much employed by Thomann, Reil, Bayler, Horn, Schmidtmann, and Willich; and has been frequently precribed by the author in this state of the disease. It may be taken in doses of from two to six or eight grains, every four, five, or six hours, and conjoined with calomel and opium, or with antimony and henbane, according to the character of the attack. The latter combination may be preferred when the inflammation approaches the sthenic form, and then the camphor may be given in the smaller doses; the quantity of it being increased as the asthenic character predominates. It may be further combined with digitalis, which is not contra-indicated in this form of the disease.

110. *Embrocations* with *spirits of turpentine*, applied over the chest or between the shoulders, are the most valuable remedies that can be used in this form of the disease, and in the advanced stages of the sthenic variety (§ 30. *et seq.*). The best mode of resorting to them is by means of two or three folds of flannel, of sufficient width to cover the greater part of the chest. These should be wrung as dry as possible out of hot water, be instantly sprinkled freely with spirits of turpentine, and applied to the surface; taking care to cover them, when thus placed on the thorax, with a napkin, oil-skin, or other material which may prevent or much impede evaporation. This embrocation should be kept applied as long the patient will endure it, or be renewed from time to time. Instead of the spirits of turpentine, an embrocation consisting of equal parts of the compound camphor liniment, and of the turpentine liniment, with a little cajuput oil, may, after having been well shaken, be sprinkled on the warm flannel, and applied as thus directed. I believe that the inhalation of the vapour from this embrocation is partly influential in producing the benefit which accrues from it, and which I have witnessed in many cases.

111. In this form of the disease, and particularly in its advanced stages, the warm *expectorants* may be severally employed. The *senega*, which was praised by Thilenius, Hufeland, Beaume, Oberteuffer, and others, is amongst the best expectorant remedies in this state of the disease, particularly when aided by other appropriate medicines; as the æthers, hydrocyanic acid, the paregoric elixir, &c. *Arnica* has been also much recommended, particularly by Fischer, Hufeland, Rau, and other German physicians. I have had no experience of its effects in this malady. *Cinchona*, or the sulphate of quinine, is advised by Williamson, Laennec, and others: I have given the quinine with camphor and henbane with benefit. The infusion or tincture of *valerian* is prescribed by Horn and Thomann. I have tried it in a few cases combined with ammonia and with narcotics and sedatives, and have found it most beneficial in the complication of pneumonia with the adynamic states of the eruptive fevers, or with hooping-cough (§ 70.). *Ammoniacum, assafœtida, myrrh*, or *squills*, may severally be advantageously combined with soap, or with an alkali or an alkaline carbonate, or with other substances suitable to this state of pneumonia. *Musk* was much praised by Reill and Horn. M. Recamier has more recently employed it in very large doses, and has viewed it as almost specific in this variety of the disease. *Phosphorus* was prescribed many years ago by Barchewitz; but it does not appear to have had a sufficient trial, either then or since, in this form of pneumonia, the only one to which it is appropriate.

112. In the typhoid or asthenic states of pneumonia, as well as in the advanced stages of the sthenic, when the disease has assumed the former character, and when diffusive infiltration of the cells and small bronchi has manifestly interfered

with the functions of the lungs, benefit sometimes results from prescribing the decoction of senega in doses so large as to induce *vomiting*, or from giving along with it the sulphate of zinc, in sufficient quantity to produce this effect. In some of the *complications* of pneumonia, particularly those with hooping-cough, croup, and bronchitis, the *emetic* effect of these medicines is often very beneficial.

113. In the more *malignant* forms of asthenic pneumonia, more especially in those complications of it sometimes met with in adynamic or putrid eruptive and continued fevers, the posture of the patient should be changed as often as possible, as justly advised by Mr. GERDY and Dr. STOKES, in order to prevent the more depending portions of the lungs from becoming irreparably infiltrated or congested, from a protracted retention of the same position.

114. *C. Treatment of Complicated Pneumonia.*— The complications of the disease require not merely strict attention to their *nature*, but also to their *characters*, as respects the states of vascular action and of vital power. The treatment must be based more especially upon these latter, upon their *sthenic* or *asthenic* states, and upon the grades in which either of these characters may be manifested; but also with due reference to the nature of the complication.

115. *a.* The association of pneumonia with *bronchitis*, or *broncho-pneumonia* (§ 69.), requires general or local blood-letting, or both, commonly in moderation, and a free recourse to tartarised antimony; afterwards camphor, ipecacuanha, and the milder expectorants, with sedatives and rubefacient embrocations or blisters applied on the chest, are generally of service, and accelerate or ensure recovery. When pneumonia is associated with double bronchitis, it most commonly assumes an asthenic character, and requires the remedies advised for that form of the disease (§ 109.).

116. *b. Pleuro-pneumonia*, or the complication with *pleuritis* (§ 73.), requires a free and prompt recourse to general and local blood-lettings, in the manner advised above, and to the exhibition of calomel and opium, sometimes with colchicum or digitalis. In this association calomel and opium, in large or frequent doses, are especially beneficial in promoting the effusion of lymph, and in procuring the absorption of what may have been effused; and, although the tartarised antimony is useful, in addition to these, it is less so in this complication than in broncho-pneumonia, for which it is a principal means of cure, and to which the calomel and opium are not so appropriate. If the dulness on percussion, buzzing, bronchophony, and other signs (§ 75.), indicate considerable interstitial infiltration of lymph, and effusion from the pleural surface, calomel or other mercurials should be continued or prescribed so as quickly to affect the gums; and blisters ought to be repeatedly applied to the side. After inflammation is removed, and pleuritic effusion only remains, the hydriodate of potash, with liquor potassæ, may be prescribed internally, a mercurial being given at bed-time; and the terebinthinate embrocation, alternated with blisters, should be applied to the chest. If the effusion is so great as to endanger collapse or partial obliteration of the cellular condition of the lungs, *paracentesis thoracis*, and the means advised for this state in the article PLEURA, may be resorted to.

117. *c.* The complications of pneumonia with *eruptive* or *continued fevers* (§ 71.) are frequent and require close attention, not merely in detecting them, but also in recognising the exact states of vascular action and of vital power by which they are characterised. Upon these states will depend the treatment which should be adopted. When the fever, and consequently the pulmonary affection complicating it, assumes much of the *sthenically* inflammatory character, blood-letting general or local, but more frequently the latter, will generally be required; but in large towns, and during the epidemic prevalence of these maladies, unless they assume a decidedly inflammatory or phlogistic diathesis, vascular depletions should be cautiously practised; calomel and opium, tartarised antimony, camphor and henbane, rubefacient embrocations, blisters, and similar means, being more generally appropriate. If these complications, particularly with eruptive fevers, assume an *asthenic* or *malignant form*, the means recommended for the treatment of this form of the disease (§ 109. *et seq.*) should be promptly resorted to, more particularly camphor in full or large doses, with tonics, stimulants, or antiseptics, or with these and anodynes, according to the peculiarities of the case. In these complications more especially, the assiduous application of the warm terebinthinate embrocation to the chest (§ 110.), will be found remarkably beneficial. The complications of pneumonia with *fevers* — both *continued* and *eruptive* — are fully considered in the articles FEVER, MEASLES, SCARLATINA, and SMALLPOX, to which the reader is referred.

118. *d.* Of the association of pneumonia with *hooping-cough* (§ 70.), it is unnecessary to say more than I have advanced in that article. The treatment should depend chiefly upon the character of the disease and circumstances of the patient. In most instances, however, after moderate vascular depletion, most frequently local, anodynes, anti-spasmodics, emetics, rubefacients, and external derivants, will be found most beneficial. During hooping-cough, pneumonia rarely occurs in a pure form, but chiefly in that of *broncho-pneumonia* (§ 69.). In the early stage, when the paroxysms of cough are not followed by vomiting, the occasional exhibition of an ipecacuanha emetic will be of great service; and, as the disease advances, conium, hyoscyamus, or hydrocyanic acid, if the patient be not too young, may be added to demulcents or diaphoretics, in order to soothe the cough and allay local and general irritability. In the cases of *infants*, however, these and other narcotics should be used with caution. In this complication, the terebinthinate embrocation (§ 110.) applied between the shoulders, or the liniment rubbed along the spine, for a few minutes, night and morning, will prove very beneficial.

119. *e. Croup*, particularly when it is fatal, is generally complicated with pneumonia. After local depletions, the means advised for the complication with hooping-cough (§ 118.) are most appropriate, aided by emetics of the decoction of senega with ipecacuanha or sulphate of zinc, and rubefacient embrocations or blisters applied to the chest. Calomel, antimony, &c., are also generally requisite.

120. *f.* The association of pneumonia with *influenza* (§ 70.) occurs, as in hooping-cough,

in the form of *broncho-pneumonia*; and the treatment should depend chiefly upon the character of the existing epidemic. In most instances, both of such epidemics and of individual cases, vascular depletions should be resorted to with great caution. In the many cases of this complication which I treated in 1837 even local bleeding was not required; and in a very few instances where only a few ounces of blood were taken by cupping, no benefit resulted from its abstraction. The treatment should not, in this state of disease, be different from that which I have advised for the asthenic form of pneumonia (§ 109.). See also article INFLUENZA (§ 42.).

121. *g.* The occurrence of pneumonia in connection with *tubercles* or pulmonary *hæmorrhage* (§ 76.) requires vascular depletions, but generally local, more especially by cupping. Tartarised antimony, digitalis, external derivation by blisters and rubefacient embrocations, issues, &c., are the chief means which may subsequently be prescribed.

122. *D.* The remarkable *prevalence* and *fatality* of pneumonia among *infants* and *children* (see § 80.) require a few remarks. It may be asked, to what causes are the prevalence and fatality owing? The former is manifestly owing chiefly — 1st. To the greater susceptibility of the organs in infancy and childhood to the impression of external agents; and to their more marked disposition to react upon or after the impression of sedative agents, such as cold, if the sedative operation be not such as to overpower vital reaction; — and 2d. — *a.* To the circumstance of this class of patients being frequently subjected to the depressing influence of cold, without the ability of making those exertions which may enable the circulation to resist this influence. A child, before it can run about, is often carried out and exposed during too long a period to the cold air, in a state of perfect quietude; and, although the surface of the body be warmly clothed, still the cold air paralyses the organic nervous influence of the lungs, and causes congestion and engorgement of them, which are soon converted into inflammatory action, as soon as removal into a warm air — often rapidly or suddenly effected — developes vascular reaction. A certain grade of cold, relatively to the state of susceptibility and of vital action, is followed by inflammation; a greater degree of cold produces inflammation, which rapidly passes into disorganisation.

123. *b.* The *fatality* of this disease in young children is chiefly owing to the frequently latent form it assumes, to the circumstances of the patient being unable to express his feelings, or to convey a satisfactory idea of his ailments, to the complaint being often mistaken for a common cold, and to the consequent neglect of a suitable treatment until the disease has advanced beyond the reach of remedies. Hence the importance of an early attention to pectoral symptoms during infancy and childhood. A neglect of these, and allowing the slighter attacks of pneumonia at this epoch to lapse into a chronic state, or altogether leaving them to nature, are frequent causes of tubercular formations, in their incipient or early stages, which may remain for years latent, or be slowly developed, to burst forth in more open disease at some future period.

124. *c.* The *treatment* of pneumonia *in children* is not different from that in adults, due reference being had to the age, constitution, nutrition, and strength of the child; to the character or form of the disease, and the stage to which it has advanced. Very frequently the disease has advanced far before it is seen by the physician, and the period for vascular depletions has entirely or well nigh elapsed; and then mercurials and external derivants are chiefly indicated; and these are very frequently unequal to the control or removal of the disease. At an early stage, blood-letting, calomel, James's powder, or other antimonials, with suitable anodynes, are required; but tartar-emetic should be given with great caution at an advanced stage; calomel, with extract of poppies, the liquor ammoniæ acetatis, with vinum ipecacuanhæ, and a few drops of the spiritus ammoniæ aromaticus, and rubefacient embrocations, particularly the terebinthinate (§ 110.), are then the most efficacious remedies. If blisters be applied, they ought not to remain on the part above four hours, and they should be replaced by warm bread and water poultices, which may be renewed every two hours. Blisters are very apt to be followed by severe sores, or by sloughing, when applied at an advanced stage of pneumonia, if these precautions be not attended to; and the tartar-emetic ointment often produces no less unpleasant effects. The embrocations here recommended are never productive of injury. Pneumonia in children most frequently exists as a *broncho-pneumonia*, but this circumstance does not materially modify the treatment now advised. When the bronchitis is double, the attendant pneumonia is generally *asthenic*, and requires the remedies recommended for that variety (§ 109. *et seq.*).

125. *E.* Although pneumonia generally assumes an asthenic form in *aged persons*, still this does not always obtain. In a few instances, copious blood-letting may be prescribed even in very aged persons. I have directed it in a person aged about eighty years; and have mentioned above (§ 104.) instances of a successful recourse to it at nearly as great an age, even when delirium had supervened, the symptoms indicating high phlogistic action. In most cases, however, it should be most cautiously, or only locally, or even not at all, prescribed; and chiefly at the very commencement of the attack, for the period at which it is beneficial soon passes away. I have, however, found tartar-emetic alone, or with calomel and opium, well borne at a far advanced age; and expectorants especially beneficial, as the disease proceeds. Blisters, embrocations, and other external derivants are generally useful; and even at an early stage, when the pneumonia is complicated with bronchitis, which is often the case in aged as well as in very young patients, they may be prescribed.

126. *F.* In the *dark races*, and particularly among individuals belonging to them who have recently migrated to cold countries, or to highly elevated regions, and to changeable climates, pneumonia generally assumes an asthenic form. In intertropical countries, also, these races do not bear copious blood-letting, even when the subjects of pneumonia. It should, therefore, be resorted to amongst them with great caution, in small quantity, only at the very commencement of the disease; or it should be entirely omitted, and the means advised for asthenic pneumonia be had

recourse to. This inability to tolerate vascular depletions characterising these races depends chiefly upon the greater laxity of their soft solids, and the nature of their diet, habits, and modes of living. The individuals of the negro race, born in the northern states of America, and much better fed than those living within the tropics and obtaining only poor or scanty vegetable food, bear blood-letting better than they.

127. *G.' Diet and Regimen.*—The *diet* ought to be strictly antiphlogistic in the *sthenic states* of pneumonia and their complications. Mucilaginous or farinaceous fluids only should be taken, in small quantity only. In the *asthenic form* of the disease, light nutriments may be given, at rather short intervals, and in very small quantity. Persons addicted to the excessive use of intoxicating liquors may be allowed, in this form of the disease, and particularly in its advanced stages, certain quantities of the beverages to the use of which they had become habituated. Children affected by the asthenic form of the disease may be allowed asses' milk, more or less diluted according to the circumstances of the case. If the disease in them be associated with gastro-enteric irritation, as is not infrequently observed, this should be the chief or only diet.

128. If gangrene or extensive suppuration take place, jellies, beef-tea, wine, &c. may be allowed. As convalescence commences and advances, weak veal or mutton or chicken broth may be given in small quantity, with boiled rice or with toast; and subsequently the lightest baked puddings, water-souchée flounders, and the white kinds of fish, &c., may be cautiously ventured upon. Attention should be paid, during convalescence and the course of the disease, to the preservation of a free state of all the secretions and excretions.

129. During the treatment the patient should be kept out of currents of cold air, in a large apartment, the temperature of which should not vary much above or below 60°. In asthenic, prolonged, or severe cases, the position of the patient ought to receive attention, with the view of preventing hypostatic congestion. Respiration and expectoration will be favoured, particularly when both lungs are affected, by raising the chest by a bed-chair. During convalescence great care should be taken at first in changing the apartment, and subsequently in exposure to the open air.

130. viii. CHRONIC PNEUMONIA. — *Chronic Inflammation of the Lungs. — Primary and consecutive Chronic Pneumonitis.*

131. DR. STOKES correctly remarks, that it is difficult to define the exact meaning of the term *chronic pneumonia*, or to draw the line of distinction between it and that low irritation of the lung which is followed by tubercular infiltration; and he seems to infer that there are two forms of the disease, the one producing the iron-grey and indurated lung, and the other forming, or ultimately passing into, tubercular solidity. The *first* he calls the simple chronic, the second the scrofulous pneumonia. Many of the cases of senile phthisis may be referred to the second variety. These forms of disease differ remarkably in their liability to produce suppuration. DR. STOKES contends, that in the scrofulous affection, suppuration, though slow in its occurrence, is almost sure to supervene; whilst in the simple form abscess is seldom observed, the termination being in that hard and semi-cartilaginous condition termed "*induration gris*" by M. ANDRAL.

132. Chronic pneumonia, in a primary form, is very rare. It is commonly observed as a sequel of the acute disease, and as a complication of other lesions of the lungs, and in connection with prolonged organic lesion of the heart. The grey induration constituting the more simple form of the disease varies in its aspect like acute hepatisation, according to the tissues chiefly affected. It may thus assume a granular or oolitic aspect, owing to the thickening, as Dr. WILLIAMS contends, of individual vesicles. In some cases it appears streaked and veined, from the hypertrophy of the interlobular septa and cellular tissue around the vessels; in others it is more uniform and of a darker colour. In this last variety, the cellular tissue between the lobules is sometimes thickened to the extent of several lines, and is of a light drab or grey colour, like that of miliary granulations, and, like them, has almost the density of cartilage.

133. These changes are chiefly consequent upon acute pneumonia which has been imperfectly subdued, but they are frequently also found complicating *tuberculous* states of the lungs; the solidifications, so frequently met with in these states of the organ, being entirely identical with the changes now described as being a sequela of acute pneumonitis; and hence it may be inferred, as noticed above (§ 67.), either that chronic pneumonia may give rise to tuberculous formations, or that tubercles may occasion a state of chronic irritation of the substance of the lungs followed by solidification. Probably both modes of morbid succession may obtain in different cases, more particularly the latter. These chronic solidifications of portions of the lung are met with in connection, not only with tubercles, but also with irregular dilatation of the air-cells; hence the organ often presents a knobby surface after death.

134. *A. The symptoms and signs of* chronic pneumonia are chiefly the continuance, in a less severe form, of those attending the acute disease. The cough, dyspnœa, or oppression at the chest, quickness of respiration, &c., are still felt, although less urgently, and are readily induced even by slight exertion. Quickness of pulse and heat of skin occur towards night, and the improvement following the acute attack is either slow, or, after a time, altogether checked. Partial dulness on percussion, with some bronchial respiration and vocal resonance, may be detected near the seat of inflammation.

135. I agree with Dr. WILLIAMS in his remark, that several cases of consumption appear to originate in this way, independently of any distinct tuberculous disease or diathesis; and I have at this time a case of this kind under my care. In these, the previous health has been good, and the chest free from any indication of disorder, before the attack of acute inflammation, which, afterwards lapsing into a chronic state, has laid the foundation for consumption, which has ultimately proved fatal. This form of disease, however, is slower and less intractable than the true tubercular consumption; it is more local and less constitutional; and if circumstances do not promote its extension, nature, aided by art, may ultimately effect partial or complete restoration of the organ.

136. *B. The treatment of chronic pneumonia*, when consequent upon the acute disease, consists

of a mild course of mercury aided by external derivation, by means of open blisters, or of tartarised antimonial ointment, or of rubefacient embrocations (§ 110.), or of issues or setons. Either after the mercurial has very slightly affected the gums, or soon after commencing the use of it, two or three grains of the iodide of potassium should be given with from 20 to 30 drops of the liquor potassæ, three times daily, in any of the preparations of sarsaparilla. The doses of these medicines, and the continuance of them, should, however, be varied with their effects, and with the peculiarities of the case. Sea-air, regulated diet, and gentle exercise, ought also to be recommended. (See Art. TUBERCULAR CONSUMPTION.)

II. EMPHYSEMA OF THE LUNGS. — SYN. *Pulmonary Emphysema.*

CLASSIF. — IV. CLASS, II. ORDER (*Author*).

137. DEFIN. — *Constant shortness of breath, dyspnœa, &c., depending upon excessive dilatation of the air-cells, or upon infiltration of air into the connecting cellular tissue, or upon both.*

138. Previous to the time of M. LAENNEC, emphysema of the lungs was viewed as an infiltration of air into the cellular tissue of this organ. That pathologist, however, extended the application of this term, so as to embrace simple dilatation of the air-cells or vesicles, and divided emphysema of the lungs into two varieties, namely, *vesicular* emphysema, and *interlobular* emphysema; the former being dilatation of the air-vesicles, the latter infiltration of air into the cellular tissue which connects them. To these, a *third* variety has been added by some French pathologists, particularly M. BOUILLAUD, consisting of an extrication of air immediately beneath the pulmonary pleura, which is elevated in the form of a cyst, varying in size.

139. i. VESICULAR EMPHYSEMA. — *Dilatation of the air-cells.* — *A. Description.* The lesion described by M. LAENNEC under this appellation essentially consists, as I have just stated, of dilatation of the air-vesicles, with some degree of change as respects their form. The dilated air-cells vary most commonly from the size of a millet-seed to that of a bean. Those of the largest bulk probably are sometimes formed of several cells, owing to a rupture of the partitions which separated them. Occasionally the dilated vesicles are not observable at the surface of the lungs, but sometimes they are considerably in relief upon it, and even are, in some cases, elevated much above it. More rarely, single vesicles are observed on the surface of the lungs distended to the size of a cherry-stone, or larger, generally globular, and apparently pediculated, owing to a constriction at the point where the cell begins to rise above the surface of the lung. Cases of this kind may be distinguished from infiltration of air beneath the pleura by the circumstance of the air not being displaced, or caused to pass or circulate beneath this membrane when the vesicle is pressed upon, as may be done when the air is infiltrated in that situation.

140. When the air-cells are inordinately distended, and when this change takes place suddenly, rupture of them, and a consequent infiltration of air into the cellular tissue connecting them, are not infrequent. This constitutes the *true* emphysema, and is nearly allied to that which takes place from wounds or laceration of the lungs. In this case, vesicles of an irregular form are found on the surface of the lung, which may be displaced by pressure with the finger. These vesicles vary from the size of a hemp-seed to that of a walnut, or even of an egg. M. LAENNEC remarks, that sometimes the air, although truly extravasated under the pleura, cannot be displaced by pressure, as now mentioned. This is observed when the air is infiltrated at the point of reunion of the partitions which divide the different groups of air-cells. In this case the projection has usually a triangular form, and is small in size.

141. The infiltrated air seldom penetrates to any considerable extent into the substance of these interlobular partitions, nor into the cellular tissue surrounding the blood-vessels and ramifications of the bronchi; but the interior pulmonary substance is sometimes lacerated by over-distension of the air-cells. When this is the case, an irregular projection is observed over the site of laceration, and is proportionate in size to it. When the projection is divided it is found to contain air, and sometimes a minute quantity of blood, either fluid or coagulated; and the surrounding air-cells, forming the immediate walls of the cavity produced by the rupture, are loose, flabby, and deprived of their natural globular form.

142. Accompanying this dilatation and occasional rupture of the air-cells, the bronchial tubes, particularly those of a small calibre, are sometimes, but comparatively rarely, dilated in those parts of the lungs where emphysema exists. They are more frequently inflamed and partially obstructed.

143. When a lung affected with this kind of emphysema is dried and afterwards cut into slices, the air-cells are generally found much more dilated than they appear externally; and some of the cells are observed simply dilated, whilst others are ruptured, the partitions of several being more or less completely destroyed.

144. This form of emphysema may affect both lungs at the same time, or one only, or a part of one or both. When vesicles of a considerable size exist not on the surface of the organ, the disease may be overlooked during *post mortem* examinations. M. LAENNEC considers that the lungs of persons who have long suffered from dyspnœa, from whatever cause, always present, upon accurate examination, dilatation of the air-cells, to a greater or less extent.

145. When the lesion exists in a very high degree, and occupies one or both lungs, the appearance is very striking. When exposed, the lungs seem confined in the thorax, and instead of collapsing as usual, often project beyond the margin of its divided parietes. They feel at the same time firmer than natural, and are flattened or depressed with greater difficulty. They are also less crepitous than in health, and the air escapes from them more slowly upon pressure, and with a sound resembling that produced by the slow escape of air from a pair of bellows. When the lung is detached, crepitation is still less perceptible; and when pressed, it produces a sensation similar to that occasioned by handling a pillow of down; probably owing to increased difficulty of communication between the air in the cells and that in the bronchia, together with diminished elasticity of the structure of the lung

itself. When a portion of emphysematous lung is placed in water, it is observed to float more lightly than a part which is healthy. It is also drier even at its roots, and less moistened by the sero-sanguineous infiltration often observed after death. When a single lung is affected, it becomes much more voluminous than the other; sometimes, so much so as to press aside the heart and mediastinum, and even to occasion an increase of the size of that side of the chest.

146. Emphysema of the lungs, which consists of dilatation of the air-cells, is, therefore, often consecutively accompanied with infiltration of air from rupture of some of the cells, but not always nor necessarily. M. LAENNEC considers the latter lesion to be of less consequence than dilatation of the cells, inasmuch as the air will be absorbed and the rupture occasionally be cicatrised, whilst the dilatation is a permanent change.

147. *B.* CAUSES.—This kind of emphysema of the lungs is generally produced by extensive or severe bronchitis, and particularly by those modifications of it termed by LAENNEC dry, suffocative, and latent catarrhs. He conceives that, in the dry catarrh, the smaller bronchial ramifications are obstructed either by pearly sputa, or by tumefaction of the membrane lining them; and that, as the muscles of inspiration are much more powerful than those of expiration, air will be drawn into the cells through the obstructed bronchi, without being expelled, succeeding inspirations, which are forcible or energetic, introducing a fresh supply of air into the cells, occasioning their distension; and, when the obstruction of the bronchi is of considerable duration, rendering the dilatation permanent. There can be no doubt that one of the most common antecedents of this form of emphysema is chronic bronchitis, particularly when it is seated in the smaller ramifications of the bronchi. The obstruction of these vessels, as well as the share the air-cells themselves have in the inflammatory state, will so far injure their elasticity as to render them more susceptible of dilatation than in the healthy condition.

148. Other causes may also conspire to produce this lesion of the air-cells, such as long retention of the breath, as in the case of players on wind instruments, and reading or speaking aloud for an unusually long period. Violent exertions of any kind, which require the long-continued retention of the breath, are also causes of this kind of emphysema, although more frequently of the kind next to be considered. In rarer instances, this lesion may be produced by tumours obstructing or pressing upon the bronchi, whether those developed in the lungs themselves, as cysts, tubercles, polypi of the bronchi, &c., or those produced exteriorly to this organ, as aneurisms of the aorta, enlargements of the bronchial glands, tumours in the mediastinum, &c. It may be also consequent upon the spasmodic affections of the large bronchi sometimes attendant upon asthma, bronchitis, croup, and hooping-cough, and upon tuberculous formations, and the solidifications attending chronic pneumonia.

149. *C.* SYMPTOMS AND DIAGNOSIS.—Shortness of breath and dyspnœa more or less urgent and continued, are the most remarkable symptoms of this disease. In all the cases of it observed by M. LAENNEC, there had been habitual cough. Sometimes this was slight, infrequent, and either dry or attended with a scanty expectoration of a viscid, greyish, and transparent mucus: at other times it was more severe, occurring in paroxysms and accompanied by abundant opaque mucous expectoration. There is no fever, and the pulse is generally regular. In slight cases the habit of body and complexion are scarcely altered; but in more severe cases the countenance assumes a dull earthy hue, and the lips become violet, and somewhat tumefied. The difficulty of breathing is constant, but is increased by flatulence of the stomach and bowels, anxiety, exercise, ascending heights, — by indigestion or a loaded stomach, catarrh or bronchitis: it also presents exacerbations or paroxysms, occurring at irregular intervals, and continuing an indefinite time. The dyspnœa and cough, however, should be considered as being less the signs of emphysema, than of the disease of which emphysema is the consequence.

150. This form of emphysema of the lungs sometimes begins in infancy. It may even continue, when slight, from that period of existence through life, without materially abridging it; if the person so affected live in an easy, regular, and abstemious manner. It, however, more frequently tends to aggravate, modify, and induce other diseases, so as greatly to diminish the probabilities of life. The disordered state of respiration always attendant on it particularly affects the functions of the heart, and ultimately its organisation, giving rise at last to dilatation and hypertrophy of the cavities of the organs.

151. When vesicular emphysema is confined to one lung, or is much greater in one than the other, the side thus affected is perceptibly larger than the other, its intercostal spaces are wider and fuller, and it yields a clearer sound on percussion. If both sides are equally affected, the parietes of the thorax are depressed much less than natural during expiration, whilst the efforts to accomplish the depression are very much greater; and the whole chest, instead of its natural compressed form, is more rounded and globular, swelling out both anteriorly and posteriorly; and yields a more hollow or clearer sound on percussion than usual. Dr. STOKES thinks that the symptoms are more severe when the lower lobes of the lungs are chiefly affected.

152. The only *diagnostic* or pathognomonic symptoms are, however, furnished from a comparison of the indications derived from auscultation and percussion. The respiratory sound is inaudible over the greater part of the chest, and is very feeble where it is audible, a very clear sound being, at the same time, produced by percussion. At intervals, also, particularly when the patient coughs, a slight sibillous rattle, or a clicking or cracking sound is heard, occasioned by the displacement of the mucus in the bronchi. These signs, together with the rational symptoms already enumerated (§ 149.), and the history of the case, will generally enable us to form a diagnosis. When one lung is principally affected, the increased size and sonorousness of this side will sufficiently discriminate the disease from all others, excepting *pneumo-thorax*, from which also it can readily be distinguished, as shown in the article PLEURA. When vesicular emphysema exists in a very high degree, LAENNEC considers that it may be

accurately ascertained by the presence of what he calls the crepitous rattle with large bubbles. In this case, the sound during inspiration and coughing is like that produced by blowing into half-dried cellular membrane. It differs from the common crepitous rattle, in conveying the idea of dryness, and of being connected with bubbles which are at once large and unequal, the other rattle having qualities exactly the reverse. This phenomenon is, however, not frequent, nor of long duration, and occurs only in points of small extent. It is more common and more permanent in the *interlobular emphysema*. In rare instances the patients are sensible of a crackling in the spot where this rattle is heard. Dr. WILLIAMS has sometimes observed a sound of friction, seemingly produced by the rubbing of lobules or cells against the costal pleura.

153. *D.* PROGRESS AND PROGNOSIS. — Dilatation of the bronchial vesicles takes place only in a gradual manner. When it has reached a certain pitch, it may continue stationary for an indefinite period, and afterwards increase, or it may even diminish slowly, and disappear altogether. This last result is, however, of comparatively rare occurrence, and only takes place when the causes of the lesion have entirely ceased to act. When the dilatation of the vesicles is extreme and general throughout one or both lungs, the obstacle to respiration is then very great and the danger considerable, inasmuch as this change indicates the existence of an antecedent lesion of great severity and importance from which it proceeds and with which it subsequently becomes complicated. But when the vesicular emphysema is moderate, it is not to be considered, in itself, as a dangerous affection. According to M. LAENNEC, it is of all the forms of asthma (of which disease he considers it, but too generally and indiscriminately, as the proximate cause), that which admits the most of expectations of length of life. There can be no doubt that it constitutes one of the most frequent pathological states existing in cases of continued dyspnœa, particularly in the chronic forms of the disease, and in persons advancing in years who have been subject to the occasional causes of this kind of emphysema. In general it may be remarked, that this affection is a consequence of another disease of the respiratory organs, to which even more regard should be paid, both as respects prognosis and treatment, than to itself; and more particularly of those noticed above (§ 148.); and that it often supervenes upon and attends tuberculous formations and solidification of portions of the substance of the lungs, consequent upon repeated attacks of pneumonia, or upon the chronic states consequent upon the acute form of that disease.

154. Dr. STOKES, amongst other *conclusions*, arrives at the following respecting the vesicular form of emphysema: — 1st. That the disease consists essentially in an enlargement of the air-cells: — 2d. That the rupture and coalescence of several cells is not a constant occurrence: — 3d. That the disease increases the volume and rarefaction of the lung (when it is far advanced): — 4th. That it may occur uncomplicated with any other affection except bronchitis, or it may exist along with other diseases, which are generally chronic: — 5th. That it may coexist with great dilatation of the tubes: — 6th. That it may be *partial* or *general*: — 7th. That percussion gives a morbidly clear sound when the disease has attained a certain extent: — 8th. But that the cells may be so enlarged as to evince feebleness of respiration without change on percussion: — 9th. That the physical signs of bronchitis which occur, though indicating disease in the smaller bronchi, are not characteristic of the affection: — 10th. That the stethoscopic indication is the want of proportion between the sound of vesicular expansion, the results of percussion, and the efforts of inspiration: — 11th. That the increased volume of the lung is the source of an important physical sign; this increase being ascertained by measurement of the chest, by displacement of the mediastinum, by depression of the diaphragm, and by the lateral displacement and the depression of the heart: — 12th. That the physical signs from auscultation are much modified by the degree of yielding of the thoracic parietes; the characteristic feebleness of respiration appearing to be directly as the amount of resistance to the increased volume of the lung: — 13th. That the intercostal spaces are not protruded in this disease: — 14th. That cases of it may be divided into *two classes:* viz. those in which *the diaphragm is unaffected*, and those in which it *is depressed:* — 15th. That in the *first class* the abdomen is collapsed, and without tumefaction in the epigastric or hypochondriac regions, the heart being in its natural position: — 16th. That in the *second class* the reverse occurs; the liver is depressed, and the heart so displaced as to be found pulsating as low as the ninth intercostal space; the postero-inferior portions of the chest sounding clear even to the last rib: — 17th. That the volume of the lung varies remarkably at different periods: — 18th. That when it is greatest, all the physical signs are most evident: — 19th. That the cause of its increase is a return or exacerbation of bronchitis: — 20th. That under treatment calculated to remove bronchial irritation the vesicular murmur may return, and the volume of the lung be diminished.

155. ii. INTERLOBULAR AND SUB-PLEURAL EMPHYSEMA. — *The infiltration of air into the interlobular cellular tissue, or under the pulmonary pleura,* is the consequence either of a sudden and immediate laceration of some of the bronchial vesicles, as in cases of external injury, or of rupture of these vesicles from previous inordinate dilatation of them (§ 140.) of some duration — a consequence of the emphysema already described.

156. *A. Anatomical Characters.* When the air is infiltrated into the compact cellular tissue forming the partitions between the pulmonary lobules, small bubbles or vesicles are formed at the surface of the lungs, and disposed in the form of transparent bands, penetrating more or less deeply into the opaque substance of the organ, and becoming narrower the more deeply they pass into it. These small bubbles of air are occasionally also found in the cellular tissue in the course of the pulmonary blood-vessels. Sometimes the interlobular bands of emphysema run parallel to each other, with sound portions of lung intervening. More rarely they cross one another in such a manner as almost to isolate several of the pulmonary lobules. The transparency and want of colour of these bands, by which they are readily distinguished from the opaque pulmonary structure, are chiefly owing to the infiltration of the

air, and to the drier state of the cellular tissue into which the air is passed.

157. The infiltration of air into the sub-pleural cellular tissue gives rise to bubbles or vesicles, sometimes of very considerable size, and, in rarer cases, the pleura is elevated into very remarkable bladders. Upon pressing the bubbles of air extravasated in this situation, they are readily displaced and made to pass along the surface of the lungs. When interlobular emphysema is in the vicinity of the roots of the lungs, it frequently extends to the mediastinum, and thence to the neck and to the whole sub-cutaneous and intermuscular cellular tissue.

158. Although this kind of emphysema necessarily supposes the rupture of certain air-vesicles, the rupture has seldom or ever been satisfactorily demonstrated. It has therefore been believed by some that the air is secreted in the cellular tissue from the blood-vessels of the lungs, and not extricated from rupture of the cells or smaller bronchi; and others suppose that it is exhaled into this tissue from the obstructed cells and minute bronchi.

159. The different kinds of emphysema now described — the vesicular, interlobular, and sub-pleural — may co-exist in the same person; but this is a very infrequent occurrence. The vesicles arising from morbid dilatation of the air-cells may in such cases be distinguished from those occurring from the infiltration of air into the cellular tissue, by means of pressure and insufflation, by which the air is not made to circulate, or pass from one part to another, in the former as in the latter.

160. *B. The Causes* of this kind of emphysema are those of the vesicular emphysema, particularly when acting in a very marked manner. Infants and children are more subject to this lesion than adults, especially during attacks of croup, in the advanced stages of pertussis, and in severe attacks of bronchitis, where there is much obstruction of the air-tubes; and from fits of anger, or from struggling and crying, owing to the violent inspirations taken in such circumstances. Forcible retention of the breath during powerful or long-continued exertions; wounds, injuries, or laceration of the lungs; lifting heavy weights, straining at stool, and the advanced state of the acute suffocative catarrh or bronchitis, are the most efficient and frequent causes of this kind of emphysema in adults. The spontaneous secretion or exhalation of air into the cellular tissue of the lungs may possibly be a cause of the disease; but this has not been satisfactorily shown. M. Laennec remarks that interlobular emphysema is very seldom consequent upon the vesicular form of the disease, owing to the great density of the cellular tissue intervening between the air-cells and lobules, as shown by Reisseinsen; and, perhaps, to some degree of thickening of the parietes of these cells during the continuance of their dilatation. Extravasation of air into the cellular tissue, connecting the pleura with the lungs is much more frequently met with as a consequence of the vesicular species of the disease.

161. *C.* The *symptoms* and *diagnosis* of this species of emphysema are dyspnœa and shortness of breathing suddenly following violent exertion, or continuing in a marked degree after croup, suffocative catarrh, or any other disease which may have occasioned obstruction for a time of the bronchi. In some cases the patients are sensible of a kind of crepitation in the part affected. On *percussion* the chest generally sounds well over the site of the emphysema, unless an engorged state of the lungs from peripneumony exists with it. *Auscultation* detects " the dry crepitous rattle with large bubbles," which Laennec considers pathognomonic of this lesion, particularly when this sign is very distinct and continuous. It is never wanting, and is always more marked than in the vesicular emphysema. Together with this sign, a sound or sensation as of one or more bodies rising and falling, and rubbing against the ribs, are usually perceived during inspiration and expiration. The dry crepitous rattle with bubbles, and the friction of ascent, during inspiration, and of descent, during expiration, with the occasional production of the crepitation by pressing the intercostal spaces over the affected part, are the signs of this lesion most to be depended upon, and are the least liable of the other stethoscopic signs to temporary interruption from obstruction of the bronchial tubes. Should an external emphysema appear at the same time with, or subsequent to, the above symptoms beginning in the neck, the nature of the disease then becomes perfectly evident.

162. iii. Treatment.—*A. Of Vesicular Emphysema.* Care should be taken to avoid the exciting causes, more especially all exertions of the voice, and exposure to the inhalation of dust, or of particles of any kind which may float in the air that is respired, or of deleterious gases or vapours. Violent mental emotions, and the influence of cold and humidity, or other causes of catarrh, coryza, &c., should also be shunned. Attention ought to be directed to the state of the digestive organs; the secretions and excretions being preserved in a regular state, and flatulent distension of the stomach and bowels being prevented. These objects ought to be kept in view, particularly as respects those who have had parents affected by the disease, even although they may not themselves have experienced an attack; for it would appear, from what M. Louis has advanced, that the parents of more than one half of the patients which he treated had been similarly attacked; thus indicating an hereditary predisposition to the disease in a very large proportion of those affected by it. In entering upon the treatment we should endeavour to distinguish the cases which are *simple* from those which are *complicated*, or consequent upon, or associated with, organic or other affections. Most of the means of cure recommended for *chronic bronchitis* (see art. Bronchi, § 91. *et seq.*) are more or less beneficial in this affection. The medicines which I have found the most serviceable, particularly when the complaint is exacerbated by cold, &c., are camphor, myrrh, assafœtida, and the balsams, with henbane, or extract of poppy, or opium; the decoction of senega with an aromatic water; the liquor potassæ, and small doses of the iodide of potassium; the mixtura ferri composita, with the alkaline sub-carbonates and anodynes or narcotics; the compound decoction of sarsaparilla, with an alkali and an anodyne; the sulphate of zinc, with the compound ipecacuanha pill; and the compound squill pill, with soap, and the compound galbanum pill. Rubefacient *liniments* and *embrocations* (§ 110.), or a blister or warm plaster applied to the chest, or any of the stimulating *liniments* prescribed in the

Appendix (F. 296. *et seq.*) rubbed along the superior parts of the spine, will also materially contribute to the relief of the patient. The *inhalation* of various balsamic fumes or terebinthinate vapours, or the vapour of tar, of creasote, or of iodine, when much diluted in the steam of warm water, as advised at another place (see art. Bronchi, § 100.); or *smoking* stramonium, opium, or tobacco, or other narcotics, is generally very beneficial in the more urgent cases.

163. It has been supposed that vesicular emphysema, when once established, cannot be altogether removed. Dr. Osborne and Dr. Stokes, however, think that the disease is susceptible of very great amelioration, if not of complete cure. In this opinion I concur. As the disease is a consequence of hooping-cough, bronchitis, chronic pneumonia, and the dry catarrh of Laennec, much of the treatment which is appropriate to these maladies is also suited to it. When symptoms of congestion in the lungs still continue, or when the complaint has recently followed these or other affections of the lungs, local depletion by means of cupping, or even dry-cupping, may prove useful. If local depletion be adopted, it should be resorted to before expectorants, and the means just mentioned, are prescribed. It has been suggested by Mr. Martin and Dr. Stokes to try the effect of strychnia in this disease; but the contractility of the air-cells and tubes can hardly be restored by other means than by those which will promote the general tonicity and health of the frame; and of these, residing in a pure, dry, and moderately warm atmosphere, and attention to all the digestive and assimilative functions, are the most influential.

164. *B.* When the disease is *complicated* with some other lesion, as congestion, inflammation, or obstruction of the minute bronchi, with chronic bronchitis or dry catarrh, or with chronic pneumonia, tubercular infiltration, or solidification of portions of the lungs, the treatment should be chiefly directed to these in the first instance, and subsequently to the restoration of the tone of the pulmonary cells, by the several means above suggested; and by those more fully stated in the articles Asthma and Bronchi, and more especially by those recommended for the *chronic states of Bronchitis.* In some instances I have found a residence in as dry and mild an air as the *sea coast* can furnish of great service. In two or three cases removal to Ramsgate, Brighton, Worthing, or Hastings has been advantageous. The *sea air* being invigorating to the lungs, voyaging may prove of service, particularly in the cases of young persons affected with the slighter grades of the complaint.

165. *C. The treatment of interlobular and subpleural Emphysema* requires few remarks. When air is infiltrated in the cellular tissue of the lung it is soon absorbed. When it continues or increases, it is probable that the passage of the air from the minute bronchi into the cellular substance is not interrupted by the closure of the minute laceration through which the air passed; but the laceration generally closes by means of the lymph effused, as these cases, with few exceptions recover, whatever means may have been prescribed.

III. Œdema of the Lungs.—*Pulmonary Œdema.*

Classif.—IV. Class. II. Order (*Author*).

166. Defin.—*Infiltration of a serous fluid into the cellular tissue between the cells of the lungs, and probably also into the cells themselves, occasioning dyspnœa, cough, and short breathing.*

167. *A.* The *anatomical characters* of œdema are the pitting of the organ on pressure, its greater gravity and paler colour than in the healthy state, its imperfect collapse or subsidence upon opening the chest, and a copious exudation of a frothy serum when it is divided. Œdema of the lungs occurs generally as a consequence of disease of the heart, particularly of the valves and orifices, occasioning obstruction to the return of blood from the lungs; of the exanthematous fevers; of other diseases of the lungs; and of obstructions of the kidneys, liver, &c.; it thus arising from the same maladies which occasion other dropsical infiltrations or effusions, and being often associated with serous effusions in other situations. This lesion, although previously noticed by Albertini and Barrère, was first correctly described by M. Laennec; by whom, as well as by other writers, it was ascribed to *two* causes, viz. increased effusion from interrupted circulation, and impaired absorption of the serum poured out to facilitate the vital functions of the lungs, owing to excessive vascular plethora, impeded circulation, or impaired vital power. Laennec believed that a certain degree of œdema attends the resolution of most cases of pneumonia. From this it will appear that it can rarely be a primary or idiopathic affection. Slighter grades of it not infrequently occur in the advanced stages of adynamic or typhoid fevers, particularly in the posterior or more depending parts of the lungs, but generally in connection with hypostatic congestion in the same situation; and are not to be distinguished from this condition, or from incipient congestive pneumonia.

168. *B.* The *symptoms* of œdema of the lungs are very equivocal, and vary greatly with the pathological states from which it arises. When it becomes extensive, it causes dyspnœa, short breathing, cough, and serous or thin mucous expectoration.—The *physical signs* are a crepitant or sub-crepitant rhonchus, with the breathing less fine or even than in pneumonia, and indicating the presence of more fluid in some of the larger tubes, by the mucous rhonchus. The natural vesicular rhonchus is rendered indistinct, particularly at the lower and posterior part of the chest; and percussion is followed by a duller sound, especially in those situations. These symptoms are not very different from those of the early stage of pneumonia; but the absence of fever and of the characteristic expectoration, and the presence of œdema of other parts, and of other signs of the organic lesions usually producing œdema of the lungs, sufficiently distinguish the nature of the disease. There can be no doubt of œdema occurring much less frequently in the lungs than the external cellular tissue; and it probably is never, or is very rarely, seen, but consecutively upon anasarca or external œdema.

169. *C.* The *Treatment* of œdema of the lungs should be based entirely upon the pathological conditions which occasion it. That which attends or follows low eruptive or continued fevers, particularly scarlatina, should be treated by dry cupping, frequent change of position, by diuretics, digitalis, senega, camphor, and the means above advised for *asthenic pneumonia* (§ 109. *et seq.*).

IV. HYPERTROPHY AND ATROPHY OF THE LUNGS. CLASSIF. — (See § 166.)

170. i. HYPERTROPHY of this organ is rarely met with in a true or unequivocal form. A spurious form of it arises in consequence of chronic pneumonia and emphysema. A state of the organ, which has been described by Dr. CLENDINNING in connection with disease of the heart, and which consists of a denser, heavier, and more developed condition, without any apparent obliteration of the vesicular structure, and either with or without congestion, closely approaches hypertrophy. It occurs chiefly in consequence of hypertrophy of the right ventricle of the heart, with difficult circulation through this organ. It is evident that this associated disease of both lungs and heart will be attended by shortness of breathing, more or less dyspnœa, particularly on exertion, and slight dulness of sound on percussion.

171. ii. ATROPHY of the lungs, or a state opposite the foregoing, takes place as a consequence of age; the cells becoming larger, apparently from the absorption or wasting of their intermediate parietes or septa; the substance of the lungs being softer, paler, more flaccid, and less dense than natural. A similar change is rarely observed in cases of chronic emaciation and debility. *Partial atrophy* is often observed as a consequence of bronchitis, tubercles, pneumonia, and pleuritis. ANDRAL and STOKES have argued that, when a portion of the lungs does not admit the air, owing to obliteration or obstruction of the bronchus supplying it, atrophy of it is the result, the consequent deficient circulation of blood to it, and impaired nutrition, necessarily causing this; and it has been even further supposed that an impaired state of function of the lungs, or any limitation of the function, may have some effect of the same kind, as respects the whole organ.

172. V. ABSCESSES PERFORATING THE LUNGS. — An abscess may form, or purulent matter may collect, in any of the following situations; and, by perforating the tissue of the lung, pass into the bronchi, whence it may be evacuated: — 1. In the thoracic or abdominal parietes, perforating successively the adherent pleura and pulmonary tissue. — 2. In either of the pleural cavities, and thence directly passing into the lungs. — 3. In the anterior or posterior mediastinum, through the pleura and lungs (see MEDIASTINUM, *Abscess of*), and — 4. In the liver, thence passing through the diaphragm and pleura, as shown in the article LIVER (§ 141.). The *first* of these rarely occurs: the *second* still more rarely, unless the purulent collection in the pleura is limited by adhesions of the opposite surfaces of this membrane: the *third* also rarely, but I believe more frequently than generally supposed. In a case recorded by Dr. FRORIEP (*Medicinische Zeitung*, July, 1834), an abscess of the anterior mediastinum communicated both with the lung and the vena cava. The *fourth* mode in which abscess may perforate the lung is not infrequent; sufficient notice of it and of the phenomena consequent upon it has been taken in the article LIVER, *Abscess of*.

173. VI. GANGRENE OF THE LUNGS — *a.* Gangrene in this organ is always a consequence of inflammation; but whether or not it be always caused by inflammation seated in the substance of the lung itself, or in a large vessel conveying blood to a portion of the organ, causing obliteration of this vessel, and consequent interruption to the circulation in that portion, has not been fully determined. It is not improbable that it may arise from either, or from asthenic or congestive inflammation of a portion of the substance of the organ extending to the blood-vessels. Dr. STOKES seems to believe that it may proceed from the suddenness and completeness of the congestion occurring in a morbid state of the patient; and the cases which he has instanced support this view. In all these the patients were long addicted to the use of spirits — a cause, however, of artereitis as well as of phlebitis. In one case there was chronic circumscribed gangrene, with an isolated slough in one lung, followed by acute sphacelus in the other; in another, an enormous gangrenous abscess, succeeding to contused injury of the chest; in a third, a gangrenous cavity occurring after causes likely to produce intense congestion of the organ; and in the fourth, gangrenous abscess supervening upon asthenic pneumonia. Two instances of undoubted gangrene of a portion of the lung which have occurred in my practice were observed in circumstances altogether similar to the above; both were in persons whose constitutions were injured by intemperance, and both followed congestive or asthenic pneumonia, which had been neglected in its early stages. One of these cases recovered by the aid of means about to be noticed. Drs. WILLIAMS and HUDSON have also recorded cases of recovery after gangrene of a portion of the lungs, in the works referred to in the BIBLIOGRAPHY.

174. *b.* The *symptoms* of gangrene of a portion of this organ are chiefly the appearance of a most disgusting odour of the breath and expectoration, rendering the patient loathsome to those around him, and even to himself; with general sinking, or remarkable depression of the powers of life, and collapse of the features, consequent upon a severe attack of asthenic pneumonia. The matter expectorated generally consists of a fœtid greenish, or of a dark-coloured sanious matter or fluid, sometimes attended by a discharge of blood. Dr. STOKES remarks, that the stench is not constant; for, during the progress of a case, it may disappear more than once. In some cases the expectoration is fœtid, while the breath is comparatively free from odour; but the gangrenous stench is generally perceived when the patient is made to cough.

175. *c.* The *treatment* of gangrene of the lungs should be based upon the *intention* of enabling the system to resist the contaminating influence of the septic matter formed in the organ, whilst means are being used to diminish the septic tendency of the matter — whilst bark, the chlorides, and camphor, with opium, are taken internally; and wine in the intervals between the exhibition of these, chlorine gas, or the fumes of creasote and camphor, may be inhaled. Dr. STOKES advises the use of the chloride of lime and opium. In the cases to which I have alluded (§ 173.), a somewhat similar treatment to the above was prescribed. In the first, which occurred many years ago in dispensary practice, the decoction of bark with the chlorate of potash, and compound tincture of bark, was ordered, and chlorine gas was inhaled. Camphor and opium were also taken at intervals; and the terebinthinate embro-

cation was almost constantly applied on the chest. In the second, which I saw more recently in consultation, very nearly the same means were employed, and the fumes of creasote and camphor were inhaled. In this, the unsuccessful case, the remedies appeared for a time to arrest the disease. LAENNEC recommends for this state the sulphate of quinine; and Dr. WILLIAMS the nitro-muriatic acid, which was used in the case which recovered under his care; but the particular means should be selected with reference to the previous condition and the habits of the patient.

176. VII. TUBERCLES are the most frequent lesions to which the lungs are liable. They are fully considered with reference to this organ, in the articles TUBERCLES and TUBERCULAR CONSUMPTION.

177. VIII. MALIGNANT STRUCTURES IN THE LUNGS. — The *lesions truly malignant* which are occasionally met with in the lungs are *scirrhus*, *encephaloid* or *fungoid disease* — the *medullary sarcoma* of some writers — and *melanosis*. — *A. Scirrhus* or *cancer* is very rarely observed in a true or unequivocal form in the lungs; and then only in the scirrhous state, the subsequent stages of softening, ulceration, &c. of the indurated mass, not having supervened. Scirrhus of the lungs occurs only consecutively of cancer in some other part; and most frequently of the mamma. It may involve the parietes of the chest, pleura, and a portion of the lungs; there being firm adhesions of the pleura, a shrunk, dense, and glistening state of the lungs, and dilatation of some of the bronchi. In rare cases a portion of the organ is indurated, glistening when divided, particularly near the large bronchi, and similar to scirrhus; and yet the absence of cancerous disease from all other parts renders the malignant nature of this change very doubtful. Dr. CORRIGAN has denominated this, or a very similar change he has observed in the organ, *cirrhosis* of the lungs. Open or ulcerated cancer of the lung is rarely or never seen. Dr. BAYLE has recorded a case in which this change was said to have been observed; but he has not stated whether or not the ulcerated cavity communicated with the bronchial tubes.

178. *B. Fungo-hæmatoid disease*, or *medullary sarcoma*, is sometimes met with in the lungs, much more frequently than scirrhus, and occurs either in separate *tumours* or *infiltrated* through the organ.— *a*. The medullary tumours vary remarkably in this situation. They are, in some cases, soft and brain-like; in others tough, more dense, or even fibro-cartilaginous, or much softer, and resembling the pancreas in colour and consistence. They are either encysted, or irregular and non-encysted. In some they are loose, cellular, and vascular, and contain patches of extravasated blood. In others the texture of the morbid mass partakes of two or more of the above characters. Indeed, these malignant formations — cancerous and medullary — are modifications of nutrition, depending, as I have remarked in the article CANCER (§ 26.), upon a weakened and otherwise morbid state of the system generally; this state occasioning specific changes in the organic sensibility, nutrition, and secretions of parts according to predisposition or concurring causes.

179. *b*. When the medullary matter is *infiltrated* through the lungs, it appears as intermediate between tuberculous disease and chronic hepatisation or consolidation, and is apt to be confounded with either of those, if medullary sarcoma has not been detected also in some other organs or parts.

180. *c*. Whilst scirrhus is, perhaps, never primarily developed in the lungs, medullary sarcoma may occur either primarily or consecutively in them; or it may be coëtaneous in this and in other organs or parts. It is obviously a constitutional malady, and depends originally upon a depraved state of the vital powers, in connection with alteration of the circulating fluids, the albuminous portion of which is deposited in certain parts, in an exuberant and modified form, and subsequently undergoes a low and morbid state of organisation and nutrition. (See art. FUNGOID DISEASE, &c., § 18. *et seq.*)

181. *C. Melanosis* is the third form of malignant disease of the lungs; and is met with in them either in the form of distinct tumours, or as irregular cellular-like deposits, or as infiltrations of the natural structure, or, indeed, in the several states presented to observation in other parts of the body. It may affect the lungs exclusively, but this is extremely rare. It is most frequently observed in this organ and in other parts of the body in the same case. It is occasionally associated with carcinomatous or with fungoid disease. (See art. MELANOSIS.)

182. *D. Symptoms, &c.* — The occurrence of these malignant diseases in the lungs is rare, and ascertained with difficulty during life, unless pectoral *symptoms* appear during the existence of either of these maladies in some external part. The symptoms occasioned by them depend much upon the extent to which they invade the organ; and the physical signs closely resemble those of solidification from hepatisation or tuberculation. The history of the case, the general symptoms, the absence of the local or constitutional signs of tubercles, and the cachectic state of the system, with or without the appearance of anæmia, will serve to direct the diagnosis. In the early stages of these maladies, however, the symptoms are very equivocal; and consist chiefly of impeded breathing and circulation through the lungs, with emaciation, cachexia, anæmia, dropsical effusion, dyspnœa, a leaden or livid hue, &c. At more advanced periods, the expectoration, which was previously scanty or absent, becomes more abundant, and is similar to that of bronchitis or pneumonia, owing to the supervention of either or both, in the course of the malady, or rather of the destructive process occasioned by the morbid mass on the adjoining tissues. In some instances, the sputum is streaked with blood, and, in rare cases of melanosis, with some black matter.

183. When these maladies are developed chiefly in the lungs, they occasion *death*, by compressing or obliterating large vessels and bronchial tubes; and by ulcerating, or destroying by their pressure, or otherwise changing, by invading, the adjoining tissues. Cavities may be formed in the lungs in consequence of the pressure or development of fungoid or melanoid tumours; but this result is very rarely observed, unless consecutively upon the fungo-hæmatoid tumour.

184. The *treatment* of these lesions is altogether hopeless when they implicate the lungs.

185. IX. SPURIOUS MELANOSIS — *Anthracosis*, STRATTON — occurs in the lungs in a peculiar form, and from a cause affecting only this organ,

namely, from the *introduction of carbonaceous matter*, or from the *infiltration or imbibition of carbonaceous molecules.* This alteration of the organ was first noticed by Dr. PEARSON, and subsequently by Drs. GREGORY and THOMSON (*Edin. Med. and Surg. Journ.* No. 109.), and by Dr. CARSWELL (*Patholog. Anatomy*, art. "Melanoma"). This change occurs chiefly in the lungs of old people, or of those who have been long engaged in avocations by the light of smoky lamps, or in mines; and it has been observed in various grades. When fully produced both lungs present an uniform black or carbonaceous colour, affecting nearly all their tissues. The bronchial glands partake also of the same colour. This change has been shown, by the experiments and observations of Drs. CHRISTISON and GREGORY, to arise entirely from the smoke, soot, and minute particles of coal dust inhaled during the respiration of air loaded with these carbonaceous matters. A portion of these seem to be imbibed, or absorbed, by the bronchial membrane, until a considerable accumulation takes place. This may be greater in certain parts of the pulmonary structure than in others; but when it has advanced far, it seems to act as foreign matter, and to cause, or to favour, the development of irritation or even ulceration; or to render the lungs more dense and friable; this organ being even infiltrated by a black serosity, and also broken down in parts into irregular excavations, in the more extreme cases. The physical characters of this alteration — the uniform black colour of both lungs, the absence of any similar discolouration of any other organ, its occurrence in persons habitually exposed to the inhalation of the carbonaceous particles contained in the air of mines, or of smoky apartments, and the black matter colouring the organ being shown by experiment to consist essentially of carbon, demonstrate clearly the origin and nature of this change.

186. X. HÆMORRHAGE INTO THE LUNGS — *Pulmonary Hæmorrhage — Hæmorrhage of the Substance of the Lungs — The Pulmonary Apoplexy of* LAENNEC and other French pathologists. — In the article HÆMORRHAGE (§ 96.) I very fully considered the pathology and treatment of "*Hæmorrhage from the respiratory organs*," or "*Hæmoptysis*," as the disease has been very generally denominated. In it the hæmorrhage most frequently proceeds from the bronchial membrane; although the blood may also proceed from the substance of the organ, and, owing to rupture of the vesicular and cellular tissues of the organ, be poured into the bronchi, and thence be ejected, or be carried along the smaller bronchial ramifications. It is this latter, or pulmonary, form of hæmorrhage to which I shall now briefly allude.

187. *Hæmorrhage from and into the substance of the lungs* arises from the same causes as were shown to produce hæmoptysis, and presents similar complications and pathological relations as pointed out in that form of *Hæmorrhage* (§§ 108—120.). Pulmonary apoplexy or hæmorrhage (1.) may be confined to the vesicular structure of a portion of lung, the blood being poured out in the vesicles; (2.) or it may be seated in the cellular tissue, or, having ruptured the air-cells, have passed into this tissue; (3.) or it may have ruptured the pleura and passed into the pleural cavity. These varieties are usually preceded by *pulmonary congestion* of longer or shorter duration.

188. *A.* When the effused blood is enclosed in the air-cells, Dr. CARSWELL describes it as forming a round, circumscribed, solid mass, surrounded by the natural spongy tissue of the organ. The cut surface of this mass is of a very deep red colour, has a homogeneous aspect (excepting the open mouths of the bronchi and large blood-vessels, which are of a light red), and a granular arrangement, which is partly effaced by passing the edge of the scalpel over it, thereby removing the coagulated blood from many of the air-cells, a minute honey-comb appearance being thereby produced. The size of the masses varies from half an inch to two inches in diameter.

189. *B.* When the blood is poured into the cellular tissue, generally owing to laceration of the air-cells, it spreads to a great extent, sometimes to the greater part of a lobe, or even of a whole lung. In this case a ragged excavation is formed, filled partly with fluid, partly with coagulated blood, which penetrates portions of the engorged and lacerated pulmonary substance. This form of hæmorrhage may coexist in the same portion of the lung with the preceding. When this is observed, the round form, circumscribed margin, and hardness which accompany the first are well marked, and in the centre of this, when laceration has occurred, there is a quantity of coagulated blood (CARSWELL).

190. *C.* The third form is a consequence of the second, the effused blood occasioning laceration, not only of the cellular tissue but also of the pleura.

191. When blood is effused into the vesicular or cellular structure of the lungs, it may be retained in these situations, or a part of it may pass into the bronchi and be expectorated. The latter occurrence is much more common than the former; and constitutes a variety of hæmoptysis, which can rarely be distinguished during life from that variety consisting of hæmorrhage from the bronchi. The quantity of blood which finds its way into the bronchi is generally in proportion to the extent or laceration of the pulmonary tissue. When it is great, it may not only fill the bronchi of the affected lung, but also those of the opposite one, and thus occasion asphyxia.

192. *D.* The *Terminations* of pulmonary apoplexy are — 1st. *Recovery.* This takes place only in the first variety; and in its progress the granular arrangement disappears, the margin becomes less defined, the deep red passes into a dull purple, or leaden hue, or into a lighter tint; the hardness diminishes, and the blood-vessels and bronchi become permeable. At last the natural structure re-appears. — 2d. *Suppuration* and *Gangrene* rarely supervene. — 3d. Instead of being absorbed, the blood has been said sometimes to become organised or inclosed within a cyst. Dr. CARSWELL adds, that he has not met with an instance of this. — 4th. When the hæmorrhage is excessive it may be fatal either instantly or in a very short time.

193. *E.* The *Treatment* of Pulmonary Hæmorrhage is fully discussed in the part of the article Hæmorrhage above referred to (See HÆMORRHAGE FROM THE RESPIRATORY ORGANS, §§ 123. *et seq.*)

BIBLIOG. AND REFER. — *Hippocrates*, De Morb. l. ii. c. 56.; et de Intern. Affect. l. ii. c. 7, 8. — *Cœlius Aurelianus*, Acut. l. ii. c. 25—29. — *Celsus*, l. iv. c. 7. — *Aretæus*, De Caus. et Sig. Acut. l. ii. c. 1. — *Galen*, De

Loc. Affect. l. v. c. 3. — *Avicenna*, Canon. l. iii. fasc. 10. tact. 4. c. 10. — *A. Galli*, Fascic. de Peste et Peripneumonia cum Sputo Sanguineo. Bix. fol. 1565. — *J. Vischer*, De Differentiis et Causis Adfectuum Pulmonis. 4to. Tub. 1581. — *M. Pansa*, Consil. Peripneumoniæ. Annab. 4to. 1614. — *Tossius à Serra*, De Nova quadam Peripneumoniæ curandæ Ratione, &c. 4to. Venet. 1618 (*by Cold*). — *Malpighi*, Opera Posth. p. 105. (*Gangrene of Lungs.*)—*Dodonæus*, Observ. Med. cap. 12. (*Gangrene of Lungs*) — *Willis*, Pharmac. Rational. p. ii. s. i c. 8. — *Blancard*, Anat. Pract. cent. i. obs. 67. (*Gangrene of L.*) — *Baglivi*, Praxis Med. l. i. c. 9. — *R. Blackmore*, A Treat. on Consump. and other Distempers of the Breast and Lungs. 8vo. Lond. 1724. — *J. Huxham*, Essay on Fevers, with Observat. on Peripneumonies, &c. 8vo. Lond. 1739. — *J. Hoffmann*, Med. Ration. t. iv. s. v. c. 6. — *Barchewitz*, Spicileg. ad Phosphori Urinarii usum internum Medicum Pertinentia. Halæ, 1760. — *Van Swieten*, Comment. vol. ii. p. 170. — *M. Stoll*, Rat. Med. t. i. iii. iv. vii. — *F. Wendt*, Observ. de Pleurit. et Peripneum. 8vo. Gott. 1762. — *Stoerck*, Ann. Med. ii. p. 242. 259. — *J. G. T. Guilbert*, Ergo Peripneumoniæ putridæ Vomitoria. — In *Halleri* Diss. ad Med. vol. ii. — *Buchner et Krausse*, in Ibid. vol. ii. — *L. Auenbrugger*, Inventum novum ex Percussione Thoracis, &c. 8vo. Wien. 1761. — *H. Mason*, Lect. upon the Heart, Pleura, Lungs, &c. 8vo. Reading, 1763. — *F. Coste*, Traité des Malad. du Poumon, &c. 12mo. Paris, 1767. — *N. D. Falck*, Treat. on Disorders of the Lungs, &c. 8vo. Lond. 1773. *Thilenius*, Medicin. und Chirurg. Bemerkungen, p. 253. (*Senega in Asthenic Pn.*) — *H. Bellini*, Peripneumonia in Vomicam versa. 8vo. Roma. 1775. — *Lieutaud*, Hist. Anat. Méd. l. ii. obs. 57, 58. 336. — *D. J. Amar*, Instruccion Curativa de Dolores de Costado y Pulmonias. 4to. Madrid, 1777. — *L. Loeber*, Sendschreiben von der Lungenentzündung eines 110-jarigen griesses. 8vo. Dresd. 1777. — *Romani*, Essai sur la Manière de traiter les Peripn. Bilieuses. 8vo. Metz. 1779. — *Wright*, in Med. Facts and Observat. vol. viii. (*Mercury in Pn.*) — *J. de Longrois*, de la Pneumonie, de ses Symptomes, &c. 8vo. Paris, 1782. — *Callisen*, in Acta Regia Soc. Med. Haun. vol. i. p. 67. — *Bang*, in Ibid. vol. i. p. 258. (*Asthenic Pneumonia.*) — *Hallé*, in Hist. de la Soc. Roy. de Med. ad an. 1786. p. 112. (*Perforating Abscess of Lungs.*) — *F. Fiorani*, Saggio sopra la Peripneumonia. 4to. Pisa, 1788. — *J. Maharg*, Ed. Med. Comment. vol. xviii. p. 134. (*Tartar Emetic with Opium, in Pn.*) — *D. W. Sachtleben*, Bemerk. ueber die Heilung der Brüstenzündung. 8vo. Got. 1790. — *J. P. Frank*, De Cur. Hom. Morbis, t. ii. p. 128. Mannh. 1792; et Interp. Clinic. p. i. p. 102.; et Acta Inst. Clin. Viln. ann. ii. p. 56. 82. — *W. Davidson*, Observat. on the Pulmonary System, &c. 8vo. Lond. 1795. — *Kreysig*, Comment. de Peripneumonia nervosa. 8vo. Lips. 1796. — *C. G. Otto*, De Peripneumonia, &c. 8vo. Lips. 1797. — *L. C. Cappel*, de Pneumonia Typhode sive nervosa. Gott. 8vo. 1798. — *A. Portal*, Mém. sur la Nature des Plusieurs Maladies. 8vo. Paris, 1800. — *E. Horn*, Ueber die Erkenntniss und Heilung der Pneumonie. 8vo. Frank. 1802. — *J. W. Conradi*, Pneumonia u. Pleuritis in Nosologischer u. Therapeutischer Hinsicht. 8vo. Mart. 1803. — *Thomann*, Annal. Wurceb. l. ii. p. 271. — *C. Racine*, Recherches sur la Pleurisie et la Peripneumonie Latente Chronique. 8vo. Paris, 1803. — *G. H. Hoffmann*, sur la Peripneumonie Typhode. 8vo. Strasb. 1804. — *J. Alder*, Outlines of a Treatise on Disord. States of the Lungs. 8vo. Lond. 1804. — *M. Baillie*, Series of Engravings, &c., fasc. ii. t. 4. — *Bichat*, Anat. Génér. t. ii. p. 540. — *Rau*, in *Horn's* N. Archiv, b. i. p. 347. (*Arnica in Pn. Asthenica.*) — *Hanius*, in Ibid. July, 1812, p. 142. — *Marcus*, in Magazin für Specielle Therapie, b. ii. p. 336. (*Nitre, one ounce of, in fourteen hours.*) — *Sackenreuter*, in Allgem. Med. Annalen. Mart. 1811, p. 240 — *Cuming*, Lond. Med. and Phys. Journ. vol. xii. p. 113. — *Schmalz*, in *Hufeland*, Journ. der Pr. Heitk. b. xi. st. 4. p. 142. — *Gebel*, in Ibid. b. xvii. st. 3. p. 54. (*Epidemic.*) — *Mascagni*, in Ibid. b. ix. st. 4. p. 137. (*Alkali in Pn.*) — *Hufeland*, in Ibid. b. ix. st. 3. p. 96. (*Arnica in Pn. Asthenica.*) — *Widemann*, in Ibid. b. xxiv. st. 3. p. 116. — *Oberteuffer*, in Ibid. b. ix. st. 3. p. 104. — *Kortum*, in *Hufeland*, Journ. der Pract. Urzneyk. b. vii. st. 3. p. 17. — *Michaëlis*, in Ibid. b. vi. p. 217. — *Schmidtmann*, in Ibid. b. iii. p. 501.; et Summa Observ. Med. &c. t. i. p. 17—176. (*Pneumonia vera ; P. notha ; P. pituitosa ; P. occulta.*) — *Brera*, Rapporto de Resultati ottenuti nella Clinica di Padova, 1809. — *L. Valentin*, Mémoire sur les Fluxions de Poitrine. 8vo. Nancy, 1815. — *J. Mann*, Medical Sketches of the Campaigns of 1812—1814, with Observat. on Perineumonia Notha, &c. 8vo. Dedham, U. S. 1816. — *J. MacGrigor*, in Trans. of Med. and Chirurg. Soc. vol. vi. p. 381. — *L. J. Schmidtmann*, Summ. Observ. Clinic. vol. i. Ber. 1819. — *F. D. Reisseisen*, Ueber den Bau der Lungen. fol. Berl. 1822. — *Pinel et Bricheteau*, Dict. des Sciences Méd. t. xliii. Paris, 1820. — *J. C. Reil*, Ueber die Erkenntniss u. Cur. der Fieber, &c. th. ii. c. 13. — *R. T. H. Laennec*, De l'Auscultation Médiate, ou Traité du Diagnostic des Maladies des Poumons et du Cœur, t. i. 8vo. Paris, 1822. Translated by *J. Forbes*, 3d edit. 8vo. Lond. 1829. — *G. Andral*, Clinique Médicale, t. iii. 8vo. Paris, 1826. — *D. C. J. Lorinser*, Die Lehre von den Lungenkrankheiten. 8vo. Berl. 1826. — *Graves and Stokes*, in Dubl. Hosp. Reports, vol. v. — *Bouillaud*, in Revue Méd. t. iv. 1824. p. 375. (*Gangrene of L.*) — *Chomel*, Dict. de Med. t. xvii. 8vo. Paris, 1827. — *Fouilhaux*, Nouv. Biblioth. Méd. t. v. p. 169. — *Breschet* et *Edwards*, Repertoire Génér. d'Anat. et Phys. t. ii. p. 174. — *Gregory*, Edin. Med. and Surg. Journ. no. 104. p. 24. — *Pigeotte*, in Rev. Médicale, Mai, 1828. (*Pneumonia Gangrenosa.*) — *J. B. Lévrat Perratton*, Observat. sur l'emploi du Tartrate Antimonia de Potasse dans les Phlegmasies des Organes de la Respiration. 8vo. Lyon. 1828. — *W. E. Conwell*, Observat. chiefly on Pulmonary Dis. in India. 4to. Malacca, 1829. — *T. Mills*, Of the Morbid Appearances of the Trachea, Lungs, &c. 8vo. Dubl. 1829. — *C. J. B. Williams*, Cycl. of Pract. Med. vol. iii. ; and The Pathol. and Diagnosis of Dis. of the Chest, &c. 3d edit. 8vo. Lond. 1840. — *Bouillaud*, Dict. de Méd. Prat. t. iii. 8vo. Paris, 1835. — *T. Davies*, Lectures on the Dis. of the Lungs and Heart. 8vo. Lond. 1835, p. 162. *et seq.* — *Hudson*, On Typhoid Pneumonia. In Dublin Journ. of Med. Science, vol. vii. — *Graves*, in Ibid. vol. iv. — *Lebidois*, In Archives Génér. de Méd t. ii. p. 374. (*Fistula Pulmonis.*) — *Louis*, in Ibid. t. v. p. 321. (*Perforatio Pulmonis.*) — *Bouillaud*, In Ibid. t. xii. p. 392. (*Pulm. Apoplexy.*) — *Lacheze*, in Ibid. t. xvi. p. 181. — *Defermon*, in Ibid. t. xvii. p. 314. — *Piedagnel* et *Piorry*, in Ibid. t. xix. p. 452.; t. xx. p. 282. 622.; et t. xx. p. 578. (*Abscess of opening externally.*) — *Herbst*, in Ibid. t. xxi. p. 412.; et p. 614. (*Obliter. of Pulm. Art.*) — *Rasori*, in Ibid. t. iv. pp. 300. 415. (*Mag. Dos. Tart. Antim.*) — *Rochoux*, in Ibid. t. xvi. p. 465. — *Seymour*, Clinical Remarks on Pneumonia by : Report in Lancet, Dec. 16th and 30th, 1837, pp. 432. 500. — *Dalmas*, in Journ. Hebdom. de Méd. t. i. p. 503. — *Nicod*, in Ibid. t. i. p. 31. (*Gangrene of L.*) — *Perral*, in Ibid. t. i. p. 253. — *Bassedow*, Ibid. t. i. p. 256. (*Gangrene of L.*) — *Dalmas*, in Ibid. t. iii. p. 65. (*Abs. and Fistula of L.*) — *Lobstein*, in Repert. Génér. d'Anat. et Phys. t. ii. p. 346.; State of Lungs in old Persons, Lancet, no. 661. p. 179. — *Knox*, in Edin. Med. and Surg. Journ., Oct. 1836, p. 404. (*Hæmorrhagic Hepatisation of L.*) — *Schroeder*, in Ibid., July 1836, p. 174. — *R. H. Semple*, Lond. Med. Gazette, vol. xvii. p. 944. — *W. Stokes*, A Treatise on the Diagnosis and Treatment of Diseases of the Chest, part i. 8vo. Dubl. 1837. p. 311. *et seq.*; Vomica bursting into the Pleura, Lond. Med. Gazette, Oct. 22. 1836, p. 123.; *Guy's* Hospit. Reports, vol. i. p. 507.; British and Foreign Med. Rev. Oct. 1836, p. 404. 546. 554.; July 1837, p. 212. — *Petrequin*, in Ibid. April 1837, p. 509. — *T. O. Ward*, Med. Gazette, April 28. 1838, p. 186. — *T. Stratton*, in Edin. Med. and Surg. Journ. April 1838, p. 490. (*Anthracosis, or, Black Infiltration of the Lungs.*) — *Hourmann* and *Dechambre*, on Pneumonia in the Old ; in Brit. and For. Med. Rev. Oct. 1836, p. 543.; and Oct. 1837, p. 501. — (See also *Ploucquet's* Literatura Medica Digesta, art. *Peripneumonia* et *Pulmo ;* and the Bibliography and References to the articles Bronchi, Hæmorrhage from the Respiratory Organs, and Tubercular Consumption.)

LUPUS.—Syn.— *Noli me tangere ; Herpes exedens ; Lupus vorax ; Herpes æsthiomenes ; Formica corròsiva*, Auct. Var. — *Cancer lupus*, Sauvages.—*Carkinoma facici*, Swediaur.—*Phymatosis lupus*, Young.—*Ulcus tuberculosus*, Good. —*Krebs der wolf*, Germ.— *Dartre Rongeante, Loup.*, Fr. — *Canker, Eating tetter.*

Classif. — IV. Class. IV. Order (*Author*).

1. Defin. — *A chronic inflammation of the integuments, generally of the face, commonly appearing as tubercles of various sizes, singly or in clusters, livid and indolent, followed either by ichorous and phagedenic ulcers—Lupus exedens ; or by extensive changes in the skin, but without ulceration — Lupus non exedens ; the disease being neither febrile nor contagious.*

2. This disease is commonly seated in some part of the face, and has a tendency to destroy or to change both the part in which it occurs and the adjoining parts. It is not always tubercular, one variety commencing in a different form. Although the disease is usually confined to the face, or even to one of its parts, it may attack at the same time,

or successively, several regions of the body. Of the *divisions* of the disease suggested by authors, that by M. BIETT is to be preferred. I shall, therefore, adopt it with only a slight modification as to its *subdivision.*—1st. Lupus with extension of the disease superficially. — 2d. Lupus with phagedenic destruction of parts, or with extension in depth; and 3d. Lupus with thickening or hypertrophy of the affected part.

3. I. DESCRIPTION. — i. LUPUS SUPERFICIALIS. — *Lupus with superficial extension of lesion.* — This *species* may be divided into two *varieties,* that without tubercles and that with them.

4. *A. Lupus superficialis non-tuberculosus,* the superficial lupus without tubercles.—This variety attacks continuous surfaces of various extent, and destroys or alters the superficial layers of skin. It occurs principally in the cheeks, and is not attended either by tubercles or by incrustations. The skin acquires a yellowish-red tint, and is slightly elevated, particularly at the margins of the affected part. A slight epidermic exfoliation takes place on its surface, which is smooth, red, or yellowish-red, and shining; and the exfoliation proceeds slowly and without interruption. It is unattended by pain, but the part is somewhat tender when touched, the redness disappearing nearly or altogether on pressure. After the disease has continued for a very considerable time, the skin appears to be much reduced in thickness, the parts more recently invaded appearing red and slightly elevated. As the disease subsides the epidermic exfoliation ceases, the redness declines, but the skin remains thin, atrophied, shining as if seared by a hot iron, or resembling a cicatrix after a superficial burn, and allowing the subjacent vessels to appear through it, as if they were imperfectly covered. The above description of this variety is taken from a case at present under my care, which commenced nearly twenty years ago, in a spot about the size of a bean, at which time I first saw it. M. RAYER believes this variety to commence in a solitary tubercle, and to spread by the formation of fresh tubercles around those which already exist. MM. BIETT, SCHEDEL, and CAZENAVE, however, admit the absence of tubercles in this variety.

5. *B. Lupus superficialis tuberculosus — superficial tubercular lupus.* — This variety differs from the former, chiefly in the more or less manifest presence of tubercles in its early as well as in its advanced progress. These tubercles are small, soft, dusky, or yellowish red, and cover a space of various extent. They may remain stationary for a time, varying from a few weeks only to several months, or even years, when they may suddenly become the seat of irritation. Their number then encreases, the intervening spaces appear swollen and œdematous, they coalesce by their bases, their summits ulcerate, and they form a continuous ulcerated surface of irregular shape, and various extent. The cheek may thus be attacked, and the disease may slowly extend over the whole face, destroying the alæ of the nose, and spreading even to the front of the neck. The tendency of this variety is to destroy the surface of those parts on which it appears. It attacks not only the face, but also, although less frequently, the chest, and the anterior aspects of the thighs and extremities, appearing there in continuous patches The crusts covering the ulcerated surface are thick, rough, and blackish; and when cicatrices form, they are tender, thin, and livid. Tubercles often re-appear in the midst of the cicatrices, and ulceration again takes place in them. When ulceration stops, cicatrisation assumes the form of irregular white bands, stretching from the part where the disease began, and are similar to the cicatrices after burns.

6. ii. LUPUS PHAGEDENICUS. — *Lupus exedens — Noli me tangere — Lupus with extension in depth.* — This species generally begins with the appearance of one or more small tubercles on the alæ or tip of the nose. These tubercles are soft, smooth, and dusky, or yellowish-red coloured; and their progress is usually slow. This species occasionally commences as a chronic inflammation of the mucous membrane of the nasal fossæ, with swelling and redness of the nose. A thin scab then forms at the opening of the nostrils, and is succeeded by a thicker one; and ulceration is established, and extends to the alæ of the nose. In other cases, a livid tint, with slight swelling of the point of the nose, is the first indication of the disease. The discolouration increases, and a superficial sore is formed, which becomes covered by a scab, and and the ulcer extends in depth. In some instances, the disease begins in a similar manner in one of the alæ. As the ulceration proceeds a fœtid sero-purulent fluid is poured out beneath the scab, and not only the integuments, but also the cartilage, are slowly and silently destroyed. The nose is sometimes red on the surface only; and occasionally it becomes pointed, sharp, and tapering, the nostrils tending to close. The cartilage at the angle uniting the two lateral halves superiorly, seems then to project, and presents a red tint perceptible through the soft parts.

7. The extent of destruction thus produced varies extremely. In one case, almost the whole nose is destroyed; whilst, in another, the point only is partially injured, as if a portion was removed by a knife. After the ulcers have been arrested and healed, new tubercles occasionally form in or near the cicatrices, the work of destruction recommences, and the whole nose and septum ultimately disappear.

8. The progress of the disease may be slow or rapid — after several years a small portion only of the nose may be lost; and, less frequently, the whole of it may be destroyed within thirty or forty days — *Lupus vorax.* — Sometimes the least interference aggravates and accelerates the malady; and after appearing to advance towards recovery, it often suddenly assumes a more livid hue, and ulceration either recommences or is extended.

9. In rare cases, the septum is destroyed before the outer surface of the nose is implicated. When the ulceration commences in the skin of the organ, the mucous membrane of the nasal fossæ is generally chronically inflamed, and ultimately ulceration takes place in it also, and spreads along it, being occasionally reflected to the arch of the palate and to the gums, which are then deeply furrowed.

10. The tubercles of lupus exedens are sometimes formed in the upper lip near the alæ nasi, or near the commissures of the lips; and the consequent scabbing and ulceration occasion great pain, with destruction of parts. The consequent cicatrisations also give rise to deformity of the lips and mouth.

11. iii. LUPUS WITH HYPERTROPHY OR THICKENING — *Lupus non-exedens serpigenosus*, RAYER — is generally confined to the face, where it appears as an irregular cluster of little tubercles of a dingy red colour, soft, slightly prominent, and indolent. They implicate often a great portion of one or both cheeks or forehead, or even of the whole face. They do not ulcerate at their summits; but their bases appear to extend, and accidental sores sometimes appear at their circumference. As their bases enlarge, the skin swells slowly, and rises so as to fill up the spaces between them. An epidermic desquamation generally takes place from the surface of the tubercles, and is usually most remarkable around the circumference of the clusters where they are most prominent. As the disease continues, the features become much enlarged, puffed, and flabby; and this irregular thickening, with the tubercular swelling and yellowish red and dingy tint, gives the features a hideous appearance, closely resembling that of the true leprosy, with which it was doubtless confounded in the middle ages, more especially when the ears, as well as the alæ nasi and lips, were affected, as they sometimes are. Ulceration rarely takes place in this species; or, if it occur, it is accidental, slight, and superficial; and covered by very thin, laminated, and slightly adherent crusts.

12. This form of lupus sometimes appears on the *extremities* in one or more clusters of flattened lenticular tubercles of a yellowish-red tint, changing into patches of an irregular circular shape, covered by thin furfuraceous scales. These may continue for a long period stationary and small; but they occasionally spread even so as to cover the greater part of a limb. The disease may also commence beneath the ear and on the nucha, whence it may extend to the throat or shoulders, or to the occipital region, which then loses its hair.

13. This disease continues for an indefinite time. The affected parts never regain their natural appearance, even when the disease subsides: the tumefaction of the skin and subcutaneous cellular membrane diminishes, the tubercles shrink and ultimately disappear, but the skin continues thin, smooth, and shining, as in the first variety of the disease (§ 4.).

14. Either species of lupus may be, from the first, a local disease, or unattended by any very obvious constitutional disorder; but I have observed it most frequently in persons of a scrofulous taint; in those who suffer from chronic disorder of the digestive organs, and in females who are hysterical or subject to derangement of the catamenia.

15. During the progress of lupus, several *intercurrent diseases* may appear. The most common of these is *erysipelas*. In lupus with hypertrophy, the supervention of erysipelas may be favourable, the tubercles sometimes disappearing after the attack of that disease; but in other forms of lupus, the occurrence of erysipelas often aggravates the original malady.

16. II. DIAGNOSIS. — Lupus may be mistaken for scrofula, cancer, true leprosy, acne rosacea, syphilitic affections, and other tubercular diseases. — *a.* The sores, tubercles, enlargement of glands, and affections of bones, attending *scrofula*, present certain characters. Scrofulous ulcers extend by the detachment of their edges from the subjacent tissues and the formation of sinuses, in consequence of the softening and suppuration of lymphatic glands, of caries of bones, &c.; but the ulcers of lupus are the effect of a process that consumes the skin and adjoining parts from without inwards.

17. *b.* The red colour, the erythematic areola surrounding the indurations left by the pustules of *acne rosacea*, and these pustules themselves, usually seen in the vicinity of these indurations, sufficiently distinguish rosacea from the indolent tubercles of Lupus. — *c.* The general tawny or lurid hue of the skin, and the form and arrangement of the tubercles, which retain the tint of the surrounding integuments, distinguish the real *leprosy*, or elephantiasis of the Greeks, from lupus with hypertrophy. The tubercles of leprosy appear as small knotty unequal tumours, followed by swellings, which deform the face, these tubercles being commonly disseminated in several parts of the surface of the body. The tubercles of lupus with hypertrophy are, moreover, arranged in a circular form, extending at their margins, which are definitely limited and covered with squamæ; circumstances which do not occur in leprosy. — *d.* The thick incrustations of *Impetigo* are yellow, rough, and not very adherent; those of lupus are of a dark brown colour, thick and very adherent.

18. *e.* The term "*Noli me tangere*" has been loosely applied by HOME, WILLAN, BATEMAN, and S. COOPER, both to the tubercular indolent ulcerations of lupus, especially when affecting the nose, and to the malignant or virulent ulcers which sometimes attack this place, the lower eye-lids, cheeks, or lips,—which ulcers have been described by TRAVERS, LAWRENCE, MACKENZIE, and MÜLLER, as cutaneous cancer, or malignant disease of the face. These *virulent ulcers of the integuments of the face*, which often commence in or near the lower eye-lid, or upper part of the cheek, have been confounded with lupus by M. RAYER; whilst they have been distinguished from that disease by BIETT, JACOB, and BYRON, and from true cancer by these and by several other writers. These virulent ulcers seem to form a connecting link between *lupus* on the one hand, and *cancer* on the other, as respects both their local characters and their constitutional relations. They resemble the former in their seat, in their being strictly local during the greater part of their progress, without affecting the adjoining glands, and in their equally slow destructive course,—whilst they nearly approach the latter in the advanced period of life at which they occur, in their commencing in a dark pimple or scab, in the lancinating pains felt in them at an advanced stage, and in their constant but slow extension; no spontaneous check or arrest of their course taking place when left to themselves, although, like lupus, they may be completely cured by powerful escharotics and alteratives. Dr. BYRON, in a very interesting paper on this kind of ulcer and lupus, has instanced eight cases of the former which occurred at an age more advanced than that at which lupus is usually observed.

19. *f.* Lupus generally commences in several, or in a cluster of tubercles; *cancer* in a single tubercle only. The tubercles of the former are soft and indolent; the tumour of cancer is hard

and painful, is surrounded by a firm base, and is the seat of occasional lancinating pains. Cancerous ulcers are moreover everted and painful; they present a fungous appearance, without the dry thick scabs characteristic of lupus.

20. *g. Syphilis* affecting the face is often distinguished from lupus with great difficulty, especially when the disease is confined to tubercles without ulceration. The tubercles of syphilis are larger and rounder than those of lupus; are of a dusky copper colour, have much less tendency to ulcerate than those of lupus, which are flatter, softer, and covered by their squamæ, partially detached. In the state of ulceration, syphilitic tubercles differ from those of lupus. The syphilitic ulcer is deep, its edges are swollen, sharply cut, and copper-coloured; the ulcer of lupus is of a dull red, and appears confined to the skin. In this latter, the skin is first attacked, then the cartilages, and afterwards, and rarely, the bones; whilst in the former, the disease more frequently begins in the bones, and extends to the skin. The tubercle of syphilis, moreover, is generally attended by pains in the bones, by nodes, ulcers in the throat, palate, &c., and by iritis.

21. III. Prognosis.—Lupus is a most obstinate disease, months, or even many years, elapsing before it yields to treatment. Lupus exedens is seldom subdued until parts have been extensively destroyed. It is, however, less obstinate, and its consequences less severe, if a judicious treatment has been adopted at an early period, especially when its progress is slow. Soft, bluish, or livid cicatrices, surrounded by tubercles of various sizes, indicate a renewal of the disease in its most obstinate form. The establishment of the catamenia, which commonly produces a favourable change in most chronic eruptions in females, has no beneficial influence on this.

22. IV. Causes. — Lupus is a somewhat rare disease. It generally commences between the seventh and twenty-fifth years of age; and very rarely after forty. It attacks women more frequently than men, and is more common in country places than in towns. Although it occurs in all constitutions and diathesis, — the robust and the delicate, — yet it is most frequently met with in scrofulous and weakly lymphatic habits. Dr. Houghton states, that in Dublin, where the poor are inured to poverty and want of cleanliness, it is often met with, although some of the worst cases come from country places.

23. V. Treatment. — The treatment of lupus is *internal* or *constitutional* and *external* or *local*. — *A. Internal* or *constitutional* means should have reference to whatever disorder may manifest itself in the digestive or other organs, and to the form of cachexia which may be present. Generally those medicines which exert an alterative with a restorative effect are the most beneficial; and which improve at the same time the digestive, the assimilative, and the excreting processes. The more superficial forms of the disease are generally connected with the scrofulous diathesis, and in these especially the treatment advised for Scrofula is particularly appropriate. In these, as well as in the others, the preparations of *iodine*, especially in the combinations about to be noticed, are of great service.

24. The *chloride of barytes* was recommended by Bateman for this disease; but its injurious action on the stomach has prevented its general use; and the *chloride of lime* has been therefore more commonly adopted. One drachm of the solution of this substance may be prescribed in a pint of water, and half an ounce may be taken at first twice, and subsequently thrice or oftener in the day; the dose being also increased gradually. The preparations of *iron* have also been used. The tincture of the sesquichloride, and the iodide of iron are the most beneficial. The sulphate of iron, and chalybeate mineral waters, particularly those which contain carbonic acid gas, are also of service.

25. The *animal oil of* Dippel has been much employed on the Continent, commencing with doses of five or six drops, and gradually increasing them to twenty or twenty-five drops. The *decoction of Feltz* has also been advised; but these, as well as most other constitutional remedies, generally fail unless aided by local means, by light nutritious diet and pure air. The preparations of *arsenic*, especially Fowler's solution, and the *Asiatic Pills* (each containing one-thirteenth of a grain of the white oxide of arsenic and two-thirds of a grain of black pepper) have been found influential in arresting the progress of the disease. The arsenical preparations have likewise been employed in conjunction with alkalies, narcotics, especially conium, and bitter tonics. Small doses of the *bichloride of mercury* given until the gums are affected, or the same substance dissolved in the compound tincture of cinchona, have also been recommended by some physicians. More recently the combinations of iodine with mercury, or *iodides of mercury*, have been resorted to with considerable success; but the most decided benefit has been found by Dr. Byron and others to have been derived from the internal as well as external use of the "*liquor hydriodatis arsenici et hydrargyri*" of a Dublin chemist, generally commencing with five drops, given three times a day in distilled water, and increasing the dose to ten, fifteen, or twenty drops: this medicine being diluted with an equal part of pure water for external application. The great efficacy of this medicine in lupus has been proved by Drs. Graves, Hickson, Stokes, Byron, and White, and by Mr. Carmichael and other surgeons; and generally in cases which had withstood iodine, arsenic, and mercury when separately or otherwise employed, than in the form of an iodide of arsenic and mercury.

26. In all cases of this disease, a pure, mild, and dry air; the use of the warm or vapour bath, or of the vapour douche; and strict attention to diet and to the states of the digestive, assimilating, and excreting functions, are requisite. Excess in the use of animal food, or of fermented or distilled liquors, must be avoided during the treatment; and the patient ought to be restricted chiefly to farinaceous and mucilaginous articles of diet; and to the use of whey, or of fresh milk with soda or Seltzer water. During a course of internal medicine, *external* or *local means* should be carefully and constantly applied; and where there is much irritability of the digestive mucous surface, and particularly when the internal remedies above mentioned increase or induce disorder of the digestive organs, these external means should be chiefly confided in, whilst gastric irritation should be allayed by bland and digestible food, taken in moderate quantity.

27. M. Lisfranc advises the treatment of lupus to be commenced with small or *revulsive* venesections—three or four ounces of blood being taken at as remote a point as possible from the seat of disease: and, when the irritation is great, or the patient plethoric, he recommends a recourse to *depletory* bleeding. — Dr. Bateman states that, in three or four cases of lupous tubercles in the face, the muriate of barytes taken internally proved of service.

28. *B.* The *local* or *external means* advised for lupus have been as numerous as the disease has been obstinate. Before ulceration has commenced in the tubercles, particularly in cases of lupus with hypertrophy, local applications which favour absorption should be preferred. Dr. Davies of Hertford, M. Biett, and myself, were among the first to employ *iodine* and its combinations with this view — more especially the *iodides of mercury* and the iodide of sulphur, in the form of ointments. The development of erythema or even of erysipelus by these substances should not be dreaded, as either rather mitigates than aggravates the future course of the disease. In some instances the application of the tincture of iodine more or less diluted, or of the ioduretted solution of the iodide of potassium may be premised.

29. When the application of these, or frictions with ointments containing either of these iodides, are inefficacious, or when ulceration has commenced, recourse should be had to caustics. Of these, the most commonly recommended are, lunar caustic, caustic potass, the butter of antimony, the bis-nitrate of mercury, nitric acid, the animal oil of Dippel, and the preparations recommended by Frère Côme and Dupuytren. But these appear to be inferior in efficacy to the chlorate of zinc, and the liquor hydriodatis arsenici et hydrargyri, introduced by Mr. Donovan of Dublin.

30. When the disease is extensive the application of the more energetic caustics should be limited to a portion only of the surface, each portion of it being touched in succession. If the ulcerated surface be moist and clean, the caustic may be applied to it at once; but if it be covered by scabs, these should be previously removed by poultices. In the indolent and hypertrophied variety, blisters may be applied previously to caustics. The animal oil of Dippel has been much used by continental physicians, as a local irritant, in order to modify the morbid action, particularly when the nose is the seat of the disease. It should be applied by means of a small brush passed repeatedly over the whole of the surface. Dupuytren's powder (consisting of eight or twelve grains of arsenious acid, and an ounce of calomel) is a safe caustic, and has been found efficacious in the slighter cases of the disease. It should not be applied at once to a too large surface.

31. Frère Côme's *arsenical powder or paste* (consisting of white oxide of arsenic, ten grains; sulphuret of mercury, two scruples; animal charcoal, powdered, ten grains) is a powerful remedy, and is most suited to old and obstinate cases; but it should not be applied at once to a surface of greater extent than that of a shilling. It is followed by an erysipelatous inflammation of the surrounding parts. The *bis-nitrate of mercury*, prepared from one, two, or three drachms of the proto-nitrate of mercury, and an ounce of nitric acid, is much employed by M. Biett. It excites erysipelatous inflammation. It may be applied over the ulcers, tubercles, and scars which are soft or purple, or are on the point of breaking out afresh, by means of a small brush dipped in the acid; but it should not be passed over a surface of greater extent than a crown piece. Some scraped lint may then be placed over the cauterised surface, and moistened with the acid. Mr. Plumbe states, he applied the *nitric acid* freely, and produced a healthy sore which readily healed.

32. According to the observations of Dr. Byron and others above referred to, these applications may be superseded by the chlorate or chloride of zinc, and the liquor hydriodatis arsenici et hydrargyri. The former may be applied in its solid form, or rather, the diseased surface should be touched with it, as frequently as the state of parts, and as the effects produced, may suggest. The latter remedy may be applied locally from time to time, whilst it is being exhibited internally. It may be applied in a wash or lotion, with an equal quantity, or more or less of water.

33. During the treatment of this disease, care should be taken to prevent occlusion of the nostrils by the contraction of the scars. This may be done by the introduction of a piece of sponge, duly prepared, which should be persisted in for a considerable time after the cicatrices have formed. Both during the local treatment, and after a cure has been effected, benefit will accrue from vapour or warm baths, and particularly from the vapour douche. In such circumstances, the douches and baths of the Dauphin attached to the Thermes de Maria Therese at Bagnères de Bigorre; or a recourse to the douches and baths at Aix-la-Chapelle, or other places, conjoined with the advantages derivable from changes of air, of climate, of regimen and diet, will generally prove of advantage. It is not improbable that, in these cases, the regimen and diet — the use of pure water and of vegetable and farinaceous food exclusively —so eloquently and argumentatively insisted upon by Dr. Lambe, aided by pure air and regular exercise, may prove of essential service; but as to this I am unable to speak from experience. In all cases, change of air, particularly to the sea-side, and the use of the means most suited to promote the general health, or to remove associated visceral disorder, ought not to be overlooked.

Bibliog. and Refer. — *Hippocrates*, Prædict. l. ii. ed. *Fœsius*, p. 98. (*ἕρπητα ἐσθιόμενοι, eating ulcers*). —*Celsus*, l. v. (*Therioma*). — *Avicenna*, fen. iii. l. iv. tr. i. c. vi. — *Amatus Lusitanus*, Curat. Med. cent. ii. cur. 37. — *Forestus*, Observ. Chir. l. ii. obs. 9. —*Bachelet de Lindry*, sur la Dartre Rongeante. 8vo. Paris, 1803. — *Patrix*, L'Art d'Appliquer le Caustique Arsenical. 8vo. Paris, 1807. —*Lemasson*, Nouv. Biblioth. Med. 1826. —*Jacob*, in Dubl. Hosp. Reports, vol. iv. p. 282. —*Plumbe*, on Dis. of the Skin. 8vo. Lond. 1827. — *T. Bateman*, Pract. Synopsis of Cutaneous Diseases, ed. by *Thomson*. 8vo. Lond. 1829, p. 408.—*P. Rayer*, Traité Theor. et Prat. des Mal. de la Peau. Transl. by *Willis*. 8vo. Lond. 1835. p. 671. —*J. Green*, A Pract. Compend. of the Dis. of the Skin, &c. 8vo. Lond. 1835. p. 241. — *H. Houghton*, Cyclop. of Pract. Med. vol. iii. p. 169. — *R. Willis*, Illustrations of Cutaneous Diseases. folio. Lond. 1841. pl. 50. — *Cazenave et Schedel*, Abrégé Prat. sur la Mal. de la Peau. 3d edit. 8vo. Paris, 1838 — *L. Byron*, in Dubl. Journ. of Medical Science, vol. xxii. p. 57.

LYMPHATIC AND LACTEAL SYSTEM

—*Absorbent System. Vasa Lymphatica; Vasa Lymphifera; Système Absorbant*, Fr. *Die Saugadern*, Germ.

1. Pathologists have very generally attributed

not only several organic changes to the lymphatic system, but also various functional disorders. That this system is capable of an *encreased activity* of its functions is probable; but we have no proofs of the circumstance. We merely infer it from the rapidity with which fluids, or even morbid growths, are removed during certain states of the frame, or from the operation of various substances on the body. But this result may proceed from diminished activity of the vessels concerned in the production of those fluids or growths, or from a retardation or arrest of the morbid action which occasioned them, as well as from encreased activity of the absorbent system. Without, however, pursuing this subject at this place, I may remark, that it appears extremely probable that the functions of the absorbent system are controlled by the vital energies of the frame in a similar manner to the other vascular systems—that they may be diminished, augmented, or even otherwise changed, by the varying states of these energies; and that as the healthy are opposed to the morbid functions of a part, so the restoration of the latter to the former state will necessarily be followed by a return also to its original condition and form.

2. It was acutely contended by Mr. HUNTER, that an encreased state of vascular action always co-existed with diminished absorbing function in the parts where the former state prevailed; and that, as vascular action was lowered, the absorbent function became augmented. There are many phenomena which occur during disease, and in the course of various plans of treatment which seem to favour this opinion. But these may be explained in a different manner; and by simply referring them to the different states of vascular action and conditions of the secerning apparatus merely, of the existence of which states we have positive proofs, without calling to our aid an opposite condition of a different series of vessels, of which condition we have no evidence. In order to illustrate this point, let us suppose that we wish to remove an effused fluid or a morbid growth—an ascites or a bronchocele—and we succeed in our efforts. The question is, whether the means employed have produced the desired effect by changing the state of action of the vessels whence the effusion and morbid formation proceeded, bringing back this action to the healthy condition, the absorbent functions remaining unchanged; or by exciting or rousing the absorbing vessels which had become impaired, particularly in the place affected. It is obvious that the former of those effects merely would be sufficient to account for the change produced, without having recourse to the latter; for we can scarcely suppose that the means which would diminish action in one series of vessels would encrease it in another. It is, however, extremely probable that morbid depositions and growths depend not only on a diseased state of the vital actions of a part, manifested chiefly in its capillary, nutritive and secreting vessels, but also upon certain conditions of the circulating fluids; and that the same means which remove these states will seem to have restored the healthy condition of the absorbing vessels, although the functions of these vessels may have been but little affected by them.

3. The following case will illustrate this view. A professional gentleman, well known to several of my medical friends, called upon me, complaining of rheumatic pains in various parts of the body and of disorder of the urinary organs. But his chief complaint was a tumour, as large as his head, on the right side. It was firm, doughy, and apparently fatty. I prescribed the iodide of potassium with liquor potassæ in full doses. In the course of a few days the rheumatic pains had ceased, and the tumour was very much diminished in size; and after a few weeks not a vestige of the tumour remained. In this case the medicinal agents evidently operated by passing into the circulation, and thereby affecting the state of vascular action and nutrition in the tumour, and partly also the chemical condition of the fatty deposit in the cells, thereby rendering it more capable of being absorbed.

4. The influence of the lymphatics in producing disease has evidently been greatly overrated by many pathologists, and particularly by HEWSON, CRUICKSHANK, ISENFLAMM, JOHNSTONE, SŒMMERING, and ALARD. That the functions of this system may be disordered, and that they may, owing to the properties of the fluids and matters which they convey into the circulation, be frequently instrumental in the production of disease, cannot be denied. But that they are often the seat of disease seems disproved by the rarity of their organic lesions. M. ANDRAL states that he has examined the thoracic duct and principal lymphatic vessels in upwards of 600 cases, and found but in very few instances any appreciable changes in the parietes of these vessels.

I. LYMPHATICS, INFLAMMATION OF. — SYN. *Lymphangeitis; Lymphangitis; Lymphatitis; Angioleucitis; Lymphangioitis; Inflammatio vasorum Lymphaticorum. Entzündung des Saugadersystemes; E. der Lymphgefässe,* Germ. *Inflammation des Vaisseaux Lymphatiques,* Fr.

CLASSIF.—III. CLASS. I. ORDER (*Author,* in *Preface*).

1. DEFIN.—*Sharp, burning pain; diffused swelling, tenderness, and heat; red lines manifest in the course of the absorbent vessels, when external parts are affected; symptomatic fever, &c.*

2. Inflammation of the absorbent or lymphatics may be readily confounded with inflammation of the organ in which the inflamed vessels are seated; and there is every reason to suppose that both kinds of inflammation may co-exist, or the one supervene upon the other. There is no doubt that lymphangeitis sometimes co-exists with phlebitis, and that either, especially the former, may give rise to the other; in such cases, one of the diseases, particularly the phlebitis, may mask the other, according to the degree in which either is affected.

3. Lymphangeitis occurs chiefly in superficial parts, and is most frequently seen in the extremities. It much more rarely is observed in large absorbent trunks, and in deeply seated or internal organs. M. ANDRAL found in upwards of 600 dissections the parietes of the thoracic duct inflamed in three cases only. The lymphatics proceeding from the mamma are not infrequently inflamed, particularly in connection with lactation, or consecutively upon inflammation or organic lesions of the organ. Those of the lower extremities are also often affected, either consequently upon abrasions, punctures, &c., or during the puerperal states; but the lymphatics of the upper

extremities are the most frequently inflamed, owing to the liability of the fingers and hand to be injured or contaminated during the discharge of their numerous offices.

4. Lymphangeitis is rarely observed in the internal viscera, probably owing partly to the difficulty of detecting this lesion in these organs, particularly when they are the seat of other changes, or to the readiness with which it may be overlooked. However, I have seen the lacteals inflamed and structurally changed consecutively upon ulceration of the intestines, and in connection with enlarged mesenteric glands; and those of the uterus inflamed in examination of fatal puerperal cases. Similar facts have been recorded by MM. MONOD, TONNELLÉ, DUPLAY, LEE, OLLIVIER, and others. MM. GENDRIN and TONNELLÉ observed in two cases of metro-peritonitis, complicated with lymphangietis, the inflammation extending to the thoracic duct. M. ANDRAL observed the superficial lymphatics of the lungs inflamed in a patient who died of tubercal consumption. There can be no doubt of the not infrequent occurrence of lymphangeitis of internal viscera when they are the seat of ulceration, or when morbid matters are absorbed from them by the lymphatics. In these circumstances either these vessels, or their glands, or both vessels and glands, and even the veins also, are liable to inflammatory action, which may assume either an *acute* or *chronic* form, according to the constitution of the patient and the nature of the causes.

5. i. CAUSES.—*A.* The *predisposing causes* of inflammation of this class of vessels are nearly the same as those which dispose to inflammation of other vessels. A sanguine and irritable constitution and scrofulous diathesis; a weak and delicate conformation; a lowered state of the vital energies of the frame, and the puerperal states, especially the period immediately consequent upon parturition; great losses of blood; previous disease, as scrofula, fevers, syphilis, and a cachectic state of the frame; unwholesome states of the air; confined and ill-ventilated apartments, &c.

6. *B.* The *exciting causes* are mechanical or chemical irritants, especially punctured wounds; the inoculation of noxious, morbid, or putrid animal matters, or acrid substances; the absorption of malignant, ichorous, sanious, or purulent fluids from foul, cancerous, or malignant formations, sores, or from caries and scrofulous or syphilitic ulcers, &c.; the absorption of matter from whitloes, tubercles, anthrax, variolous pustules, and abscesses; the bites and stings of reptiles and insects; abrasions of the cuticle; acrid applications, burns, and scalds; the protracted or incautious inunction of mercurial or other preparations; and the bites of animals. I have seen it caused by the bite of a rat, in a very interesting case attended by Mr. RYAN of Farningham and myself; and by the bites of the cod and ling when taking the hook from their throats, and by the accidental punctures produced by their teeth. In two cases of this kind, which I saw many years ago, the symptoms assumed a very dangerous form. The most common causes are punctured and abrased wounds, and the inoculation of putrid and noxious animal matters. I have seen many instances of it in cooks and poulterers, who had injured their fingers in preparing game for cooking. Punctures or cuts during dissections are also frequent causes.

7. ii. DESCRIPTION.—*A. Symptoms of acute inflammation of the lymphatics—Lymphangeitis acutus.*—The attack may or may not be preceded by chills, or rigors; and it may be characterised by signs either of phlogistic action, or of great depression of the vital powers—by local action and fever either of a sthenic form, or of an asthenic, adynamic, or ataxic kind; the former, however, being generally ushered in by rigors, the latter seldom presenting this symptom. The form of the accompanying fever depends entirely on the nature and combination of the causes and state of the patient's constitution and habit of body; those causes which consist chiefly of mechanical and chemical irritation being generally accompanied by sthenic action, whilst the inoculation of deleterious or poisonous substances, or the absorption of ichorous or morbid matters, especially when occurring during a lowered state of the vital energies and marked predisposition, are always characterised by asthenic, adynamic, or ataxic symptoms.

8. *a.* The *diagnostic signs* of the disease are tensitive, stinging, and burning superficial pain, and tenderness in the course of the lymphatic trunks; accompanied generally with encreased heat and appearances of reddened lines beneath the skin, commencing in the seat of injury, or in an ulcerated or suppurated part, and disappearing about the situation of the adjoining glands, which generally become painful, swollen, or inflamed. These reddened lines or striæ are extremely sensible to the touch, and seem like thin knotted chords placed under the skin. The parts from which the inflamed lymphatics originate, or through which they pass, are generally swollen, tense, and moved with pain and difficulty.

9. *b.* The *constitutional symptoms* are generally those of irritative fever, with various grades of vital power, according to the nature of the exciting causes, and the circumstances peculiar to the patient at the time of their operation. They most commonly, however, assume an adynamic form; or are characterised by greatly increased or irritated vascular action, and depressed vital energy. When internal and deep-seated lymphatics are inflamed, or the principal trunks, as the thoracic duct, &c., the case is extremely obscure. The constitutional affection is generally similar to that now noticed; and the phenomena altogether differ but little from those characterising inflammation of internal veins, or from asthenic inflammation of the internal organs, whose lymphatics are affected.

10. *B. Chronic Lymphangeitis* is rarely met with, excepting in scrofulous habits, and during the course of syphilitic and malignant diseases, when it is generally associated with chronic inflammation and obstruction of the lymphatic glands. Unless the superficial lymphatics are affected, the diagnosis of this form of the disease is extremely difficult. Its existence in many cases even of this description is often merely a matter of inference, and the symptoms accompanying it are seldom distinctly marked. When the lymphatic vessels have presented the appearances on dissection usually resulting from a state of chronic inflammation, the existence of some other organic lesion, particularly of parts whence the diseased

vessels proceeded, has generally been ascertained, as of scrofulous tubercles and ulcers, syphilitic or cancerous ulcerations, caries, elephantiasis, and malignant diseases. Sir A. COOPER found the lymphatic vessels of the chord enlarged, their parietes thickened, with induration of their valves, in a patient who died with chronic disease of the testicle. Indications of chronic inflammation were observed in the thoracic duct of another patient by the same surgeon; and M. ANDRAL has found similar appearances in both the lymphatic and lacteal absorbents.

11. iii. TERMINATIONS AND PROGNOSIS. — The disease terminates, 1st, in resolution; 2d, in organic changes, chiefly limited to the vessels affected without occasioning death; and 3d, by indirectly occasioning death. — *A.* The degree of danger is to be inferred entirely from the nature of the exciting causes, from the condition of the patient's frame anterior to the attack, and from the character of the constitutional symptoms. Unless when extremely slight, and when attended with but little febrile disturbance, it ought always to be viewed as a serious disease; and when the vital energies are evidently depressed, when the disease proceeds from the inoculation or absorption of noxious matters, particularly morbid or poisonous animal secretions, when the pulse becomes very quick, with a dark-brown tongue or with low delirium, offensive secretions, &c. — when these and other symptoms of adynamic or ataxic fever supervene, the danger should be considered great. An increase or diminution of these unfavourable symptoms will of course indicate a similarly modified degree of danger. On the other hand, when all the more violent local or constitutional symptoms abate owing to the treatment employed; or when the causes are not of a very noxious description, nor the system of the patient much injured previously, or the vital energies impaired, a favourable termination may be anticipated.

12. *B.* A *fatal result* is commonly occasioned either by the extension of the inflammation along the vessels to the large trunks or into the veins, or by the introduction of the noxious cause, whatever it may be, into the circulation, and the general contamination of the fluids and soft solids of the body which it thereby produces, or by the combination of the above effects. These results, although occasionally observed in weakened and irritable states of the frame, occur not so frequently as in phlebitis; but still they occasionally take place; and, therefore, our prognosis should be guarded, and the disease considered as one of much importance. It is generally observed that the disposition of the inflammation to extend to the internal lymphatics and veins, and the liability of the morbid matter to be carried into the system, or to contaminate the frame, are great in proportion to the depression of the powers of life characterising the progress of the complaint. When these powers are sufficient to the production of coagulable lymph, by which the extension of the inflammation may be prevented, and the injurious effects of the cause of the disease thereby limited, recovery generally takes place, either by resolution, or by a limitation of these effects to the lymphatics and their glands merely.

13. *C. Appearances after death.* — These are chiefly encreased redness, thickening, an easily lacerated state, the presence of purulent matter in the vessel, and, in rarer instances, ulceration. In most cases, redness of the vessel had given place to the other lesions before death had occurred, and thickening, a dull pearly white state of the coats of the vessel, obliteration of the canal of the vessel and its conversion into an impermeable fibrous chord, are the chief changes. In more chronic cases, these latter changes, or a dilated, knotted, thickened, and indurated state, with remarkable whiteness, are generally remarked.

14. The appearances consequent on inflammation of the *thoracic duct*, in two cases recorded by M. ANDRAL (*Archives Gén. de Méd.*, t. vi. p. 502.), consisted of intense inflammatory redness of the internal surface of the canal, with thickening of its parietes in both instances. In one of them the duct was filled with purulent matter, one of the kidneys having been converted into a purulent sac, and surrounded by large collections of matter. In the other case no purulent matter was found in the duct, but all the adjoining lymphatic glands were inflamed. A similar instance is described by M. GENDRIN. M. ANDRAL states that he has observed, in other lymphatic vessels, similar lesions to those found in the thoracic duct in the above cases. He instances a patient who had died of phthisis, with ulceration of the internal surface of the small intestines, and in whom the lymphatic vessels proceeding from this part of the alimentary canal were similarly altered.

15. *Thickening* of the coats of the vessel may proceed so far as to occasion obliteration of the canal. M. ANDRAL states that the walls of the thoracic duct may be so thickened as to cause a partial or even total obliteration of its cavity.

16. *Obliteration* of considerable lymphatic trunks is occasionally observed as a consequence of inflammation. In many of these cases the obliteration proceeds from inordinate thickening of the coats of the vessel as now stated, but in others the vessel is simply constricted, or reduced to a fibrous chord. M. ANDRAL has recorded a case in which the thoracic duct was altogether obliterated, and a collateral circulation established by a considerable branch which came off from the duct a few lines below the point where it was obliterated, and re-entered it a short distance after it again became permeable. (*Arch. Gén. de Méd.* t. vi. p. 504.)

17. iv. TREATMENT. — The *Indications of Cure* in this disease are — 1st, To diminish local inflammation and irritation; — 2d, To prevent their extension along the vessels to the larger trunks and internal parts, and to fortify the powers of life against the introduction of the morbid cause into the system, or of the secretions from the internal surface of the inflamed vessels. — The *first* indication is best fulfilled by local blood-letting when the inflammation is very considerable. General blood-letting is rarely requisite, unless the patient be very plethoric or robust. I have, however, treated several cases without even local depletion, and the patients have recovered rapidly. The constant application of cloths, kept wet with cold water or with evaporating lotions, has been tried by VELPEAU and others. I have believed that these have increased the pain, and favoured the extension of the disease. More advantage appeared to accrue from warm, emollient, and anodyne applications and fomentations.

In two or three cases the local affection was almost immediately arrested by means of a strong turpentine embrocation applied to it, and of the internal medicines about to be recommended. M. Velpeau advises mercurial frictions to the part; but these are not only painful, but of doubtful advantage. A similar remark applies to vesicatories, rubefacients, and compression, also tried by this physician.

18. When suppuration has occurred or is about to take place around the inflamed lymphatics or glands, even local depletion may be dispensed with; poultices, and emollient applications, are then most beneficial; and, as soon as matter forms, a free exit should be given to it, in order to prevent its absorption, and a perpetuation or increase of the mischief.

19. The constitutional treatment, whereby the *second indication* of cure (§ 17.) may be fulfilled, is of much importance. After having evacuated, by chologogue and stomachic purgatives, fæcal accumulations and disordered secretions, tonics with alteratives will generally arrest the progress of the disease, when judiciously prescribed, and with due regard to the state of the stomach. I have generally given the decoction of bark, with the compound tincture of bark and an alkaline carbonate, or with ammonia or camphor, or capsicum, with this intention, and with the utmost benefit; but the remedies have been varied according to circumstances; still the principle of practice has been adhered to. Indeed, the same means as are fully noticed in respect of the treatment of diffusive inflammation of the cellular tissue, and of phlebitis, are altogether appropriate to this disease.* (See art. Cellular Tissue, § 34. *et seq.*; and Veins — *Inflammation of.*)

20. II. Alterations of Structure of the Lymphatic System.

Classif.— IV. Class. II. Order (*Author*).

21. Otto and others believe that organic lesions are met with in the lymphatic system, more frequently in the *young* than in the *old*. This opinion, however, applies only to certain lesions, as those connected with scrofula, rickets, and syphilis, and not to those consequent upon malignant or cancerous maladies.

22. i. *The changes more immediately connected with inflammation* have been described above (§ 13.); but it is not improbable that several of those about to be noticed, proceed more or less remotely from changes produced by acute or chronic inflammatory action.

23. ii. The *lesions affecting chiefly the canal or calibre of the lymphatics* are analogous to those found in other circulating vessels.

24. *a. Varicose dilatation.* This change of the lymphatics has been noticed by Schreger, Tilesius, Mascagni, Sœmmering, Attenhofer, Bichat, and Meckel, in persons who have died of pulmonary diseases, hernia, and dropsical effusions. It seems probable that, as in varicose veins, this state of the lymphatics proceeds from pressure on the trunks in which the dilated lymphatics terminate, or from obstructions to the course of the lymph through them. M. Amussat mentions a case in which the lymphatics of the pelvis and those coming from the groins were varicose, and filled with pus. This state of the lymphatics extended to the thoracic canal. The patient had encysted abscesses in both groins, and died from pneumonia, complicated with cerebral affection. (*Arch. Gén. de Méd.* t. xxi. p. 608.)

25. *b.* Dilatation of the lymphatics has been supposed to give rise to *rupture* of them, and various consecutive changes by Morton, Van Swieten, Haase, Assalini, Sœmmering, Brambilla, and others. That rupture may occur on some rare occasions is probable, but it is certainly not so common, nor the cause of so many diseases, as these authors believe. It has not been demonstrated satisfactorily by any of them, although Guiffart says that he had seen it in one instance. I agree, however, with Dr. Baillie in admitting the possibility of rupture of the thoracic duct.

26. *c. Constriction* and *obliteration* of the lymphatics have been believed to occur by Hallé and Ollivier; and may take place, as in other circulating canals, as a remote consequence of inflammation, or of pressure, or of obstruction of their canals, by organic or other changes.

27. The *thoracic duct* has already been shown to have been occasionally obliterated by thickening or other morbid alteration of its coats. Its canal may likewise be obstructed by a variety of morbid productions either formed in its interior, or conveyed there by absorption. It may also be obstructed by pressure made on it by tumours external to it. When this duct is obstructed or obliterated, the circulation of the lymph is generally kept up by a variety of supplementary passages: — as by, 1st. The great lymphatic trunk of the right side; 2d. By collateral branches arising from the duct below the obliterated part, and entering it above this part; 3rd. By a second duct arising from the receptaculum chyli, and ascending to near the subclavian vein where it unites with the other, entering the vein either along with it or singly; 4th. By large lymphatic trunks opening directly into different parts of the venous system, particularly into the vena azygos, the vena cava, the common iliac, splenic, mesenteric, and other veins, and into the vena portæ; and, 5th. By lymphatics communicating with veins in the interior of their glands.

---

* I recently saw, in some respects, a singular case of lymphangeitis with Mr. Ryan of Farningham, that will illustrate the treatment here recommended. A gentleman, about thirty years of age, was bit by a rat in the second joint of the right fore-finger. Inflammation of the absorbents extending from the bite up the arm to the axilla took place. I saw him a few days afterwards (the 6th of October); the arm was then swollen and hard, but the course of some of the inflamed lymphatics could still be traced. What appeared the most singular was, that there was a hard, firm, and almost elastic swelling of the arm of the opposite side, much more marked and general over the whole arm, than in the arm of the injured finger; with some swelling, stiffness, and pain of the lower limbs and joints. Tongue loaded, the pulse quick and soft. The following were prescribed: —

No. 288. ℞ Infusi Gentianæ Comp.:—Inf. Sennæ Comp. āā, ʒvj.; Magnesiæ sulphatis ʒj.; Tinct. Cardamom. Comp. ʒjss. M. Fiat Haustus omni nocte sumendus.

No. 289. ℞ Potassæ Hydriodatis gr. ij.:—Liquoris Potassæ m. xx.; Decocti Cinchonæ, ʒxj; — Tinct. Cinchonæ Comp.; Tinct. Cardamom. Co. āā, ʒj.; M. Fiat Haustus ter quotidie sumendus.

On the 23d, Mr. Ryan informed me that "he continued to improve very much from the 7th until the 17th, when he got cold, which brought on a return of enlargement of the arms and stiffness in the legs." His tongue was loaded, and brown in the centre and towards the root. A full dose of calomel and compound extract of colocynth were prescribed, and directed to be repeated if necessary. The doses of iodide of potassium and of liquor potassæ in the cinchona draughts were increased, and tincture of capsicum added to them. The stomachic aperient was to be continued. These means produced the desired effect.

28. iii. *Vices of texture, of a spurious and malignant nature*, may occur in the lymphatic system. Besides *induration*, *thickening*, and consequent *obstruction* or *adhesion* of these vessels, arising from inflammatory action, and already alluded to, other changes may implicate the parietes of the lymphatics.

29. *a. Fungous productions* have been developed in these vessels. Sir A. COOPER has recorded instances in which these were found in the thoracic duct.

30. *b. Cartilaginous* and *osseous formations* are rarely found in the coats of the lymphatics, although instances are recorded by MASCAGNI, CRUICKSHANK, WALTER, CHESTON, PORTAL, ATTENHOFER, &c., in which these changes were observed.

31. *c. Tubercular degeneration* may take place as a consecutive disease in the parietes of the lymphatics; and has been described by MM. CRUVEILHIER and ANDRAL, as occurring in these vessels in the course of tubercular consumption. In these circumstances the coats of the lymphatics proceeding from tubercular ulcerations were opaque, of a whitish yellow, hardened and thickened; their canals containing tubercular matter. In these instances, however, the tubercular change was very equivocal; for, although the contents of the vessels were of this nature, yet the changes in the parietes of the vessels were similar to those generally consequent upon prolonged irritation, or chronic inflammation.

32. *d. Cancerous, carcinomatous, fungo-hæmatoid*, and *melanoid* degenerations sometimes implicate the lymphatics consecutively, although it is doubtful whether either of these varieties of malignant disease occurs in these vessels primarily, or otherwise than as a consequence of its advanced progress in some part of the body, especially cancer uteri. M. ANDRAL has detailed an interesting case of this description, in which this disease had affected the *thoracic duct* in the following manner: — this duct was considerably enlarged, of a dead white colour, and filled with a whitish puriform fluid. Its internal surface was studded with a great number of round whitish bodies, about the size of peas, which were continuous with the tissue of the parietes of the vessel, and perfectly analogous to the cancerous masses developed in the abdomen and pelvis. In the intervals between these bodies, the parietes of the duct were much thickened, and presented a dead white colour, traversed here and there by reddish lines, and in other points were reduced to a soft pulp of a dirty reddish white. The left sub-clavian vein in which the duct opened freely was distended by a number of dense clots of blood, adhering intimately to the coats of the vein, the inner surface of which was wrinkled and of a dark brown colour.

33. iv. *Morbid contents of the lymphatics and lacteals.* — The alterations presented by the *contents of these vessels* are various, and arise either from a morbid state of the vessels themselves, or from disease in a part in which they originate, — the matters which they contain either having been formed in them, or merely introduced by absorption. — *a. Blood* has been very rarely found in the absorbents in a pure state. Professor LIPPI, (*Journ. des Prog. des Scien. Méd.* t. iii. p. 102.), however, states that he has frequently observed, in cases of pneumonia and hepatitis, blood in the lymphatics proceeding from these viscera; and he conceives, that the presence of this fluid in the lymphatics to any considerable extent is incompatible with the continuance of life. M. SANSON has recorded the case of fatal erysipelas, in which the greater number of lymphatics seated in the pelvis and in front of the spine, as well as the throracic duct, were distended by blood, which, on being analysed by M. BARRUEL, was found perfectly pure. (*Archives Gén. de Méd.* t. xxi. p. 628.) MASCAGNI relates several cases of sanguineous effusion from the pleura and peritoneum, where the lymphatics ramifying on these membranes were distended with blood. This is confirmative of the remarks of Professor LIPPI. The lymph contained in the thoracic duct in the healthy state frequently presents a rose-tint, and M. MAGENDIE states that it presents this tint in a marked manner after an animal has been kept long fasting.

34. *b. Pus* has been found in the lymphatics by DUPUYTREN, VELPEAU, SŒMMERING, DUMAS, and others. M. ANDRAL has seen the thoracic duct filled with pus in a woman who had suppuration of one of the veins; the coats of the duct being red and friable. M. VELPEAU found pus in the lymphatics of the lower extremities in a case of phlegmasia dolens; and M. DUPUYTREN observed it in a case of abscess in the leg. SŒMMERING, GENDRIN, and ANDRAL, have found pus in the lymphatics, arising from ulcers of the intestines; and MASCAGNI in the lymphatics of the lungs in phthisical subjects. Dr. LAUTH states that the lymphatics up to the thoracic duct were filled with a sanious matter, in a case of gangrene of the lower extremities, similar to that existing in the gangrened part.

35. *c. Tubercular matter* of a curdy appearance has been not infrequently found in the lymphatic vessels proceeding from the ulcerated intestines of phthisical patients. M. ANDRAL, M. CRUVEILHIER, GENDRIN, OTTO, and others have adduced numerous cases of this description. In these cases the lymphatics appeared like so many knotted white chords passing from the intestines towards the mesentery. This matter also has been found in the inguinal, pelvic, and superficial pulmonary lymphatics, and in the thoracic duct. M. ANDRAL refers to a case wherein it existed in all those vessels.

36. *d. Bile* has been stated to have been detected in the lymphatics of the liver, by MASCAGNI and SAUNDERS. M. ANDRAL has not observed this; but he has seen a remarkably yellow tinge in the lymph contained in the thoracic duct of icteric patients. *Milk* has also been found in the lymphatics, by SŒMMERING and ASSALINI, in females who have died in the puerperal states.

37. *e. Calcareous matter* has been found in the lymphatics by PONCY, ASSALINI, CHESTON, SCHERL, ATTENHOFER, SŒMMERING, and LAUTH. The last-named physician states that, in a case of caries of the iliac bones, he found the lymphatics of the pelvis filled with osseous matter.

38. *f.* The molecules of *cancerous, medullary*, and *melanoid* productions, have been found in the lymphatics proceeding from the seat of these malignant diseases by most of the authors mentioned above, as well as by others.

39. III. LYMPHATIC GLANDS — DISEASES OF. — Lymphatic ganglions are composed of, 1st, lymphatic vessels variously convoluted; 2d. Fine cellular tissue uniting those convolutions; 3d. Of a fibro-cellular membrane or capsule enclosing the foregoing; and 4th. Of blood-vessels supplying the gland, both entering it along with the lymphatics and ramifying in its capsule. The nerves cannot be distinctly traced, and consist chiefly of such as accompany the distributions of the arteries.

40. The lymphatic glands are more susceptible of disease than the lymphatic vessels, and hence are more frequently the seat of it. This is owing to their organization and functions; morbid matters which fail of making an impression upon the trunks or ramifications of these vessels, not infrequently inducing inflammatory or other changes in their glands. I shall *first* notice inflammations of the lymphatic glands, and afterwards the chief organic lesions to which they are liable.

i. INFLAMMATION OF LYMPHATIC GLANDS. — SYNON. — *Lymphadenitis*, HILDENBRAND; — *Adenitis Lymphatica; Adénite Lymphatique*, OLLIVIER.

CLASSIF. — III. CLASS. I. ORDER (*Author*, in *Preface*.)

41. DEFIN. — *Swelling, hardness, pain, and tenderness in the seat of some lymphatic gland, frequently attended by chills and followed by heat, by increased pain on motion, by febrile reaction, often by redness of the surface, when superficial glands are affected, and suppuration.*

42. The lymphatic glands are often the seat of inflammation, and, although those which are more superficial, or have more or less intimate anatomical relations to superficial parts or to the extremities, are most frequently affected, those which are more deeply seated, or which are altogether internal, are also occasionally inflamed; the disease, however, seldom admitting of recognition in the latter situations during the life of the patient.

43. *A.* SYMPTOMS. — When a lymphatic gland becomes acutely *inflamed* — *Lymphadenitis acuta* — it is swollen, hard, painful, and tender to the touch. Chills or even rigors may be felt at the onset, and there is generally symptomatic fever, varying in type or character with the constitutional powers and the cause of the affection. The surface of the seat of the disease is usually warmer than natural; sometimes it is reddened and a tumour is observable, particularly as the inflammation advances and when the gland is not deeply seated. The pain usually encreases or becomes sharp; and the inflammatory action extends to the surrounding cellular tissue, rendering the swelling less circumscribed, as well as greatly encreasing it. As the skin is more distended, it is more reddened, or even livid. In the course of a few days the tumefied part becomes softer in one or more points, and a more or less distinct, superficial or deep-seated, but circumscribed, fluctuation may at last be detected, the pain having even become more pulsating. A spontaneous opening at this part, as described in the article ABSCESS, or puncture of it, gives issue to purulent matter, varying, in quantity and character, with the size and maturity of the abscess, and with the constitutional affection. After the discharge of matter, the infiltration of the surrounding cellular tissue is removed, the sanguineous engorgement and inflammatory action in the gland subside, and the aperture closes.

44. The *terminations* of acute lymphadenitis are resolution, suppuration, and chronic induration or enlargement. — *a. Resolution* is not infrequent, and may be expected when the disease remains for a few days stationary, or does not extend to the surrounding cellular tissue, the tumour remaining circumscribed and moveable. When the adjacent cellular tissue is affected, resolution very rarely occurs; and, when the skin covering the part is red and the subjacent cellular tissue much engorged, it is not to be expected. — *b: Suppuration* follows the circumstances just mentioned, especially when the surrounding cellular tissue is much infiltrated from extension of inflammation to it. If suppuration be limited to the gland, the tumour is circumscribed, moveable, and feels elastic or fungous; and when the integument covering the gland is divided, the tumour formed by it partially protrudes from the opening, and consists of the inflamed, friable, reddened gland infiltrated with purulent matter, which, with the increased injection of its vessels and infiltration of serum, occasions its enlargement. In many instances, the surrounding cellular tissue is chiefly inflamed, and the suppuration is limited to it — one or more points, particularly externally or around the affected gland, without, however, assuming a very regular or circumscribed form. The gland itself is then not so swollen as in the former case, and presents, upon being cut into, a more regular red, or greyish-red, tint, and is firmer and not so friable or soft. In other instances suppuration takes place both in the gland and in the surrounding cellular tissue, at one or more points. — *c. Induration* and *enlargement* are chiefly observed when the *acute* has passed into the *chronic state* of the disease. The lymphatic glands, during inflammation and its several consequences, present the same changes and the same *post mortem* lesions as have been fully described in the articles INFLAMMATION and ABSCESS.

45. *B. Chronic Inflammation of Lymphatic Glands* — *Lymphadenitis Chronica* — is as common a disease as the acute. It often follows this latter, and frequently supervenes in the course of chronic diseases, or of irritation of parts from which lymphatic vessels passing through glands arise, as ulcers, chronic cutaneous eruptions, &c. It is, however, most common in scrofulous constitutions, wherein it may occur either as a primary affection, or as a symptomatic or consecutive malady of other antecedent changes or lesions. (See art. SCROFULA.)

46. When the chronic follows the acute disease, the acute symptoms subside gradually, either before suppuration has commenced, or after it has taken place to a small extent, or in a limited portion only; and slight pain and heat, with swelling and hardness of the gland, continue until ultimately the latter only remain. When chronic lymphagenitis occurs primarily, the gland swells gradually, becomes hardened, and slightly pained, particularly on pressure and exertion. The skin retains its colour, and the surrounding cellular tissue is either unaffected or slightly affected, the enlarged gland being moveable. Symptomatic fever is rarely present, or, if present, in a very slight degree. No change may

occur, locally, for an indefinite period, unless some local or constitutional influence affect the engorged gland.

47. The *consequences* or *terminations* of chronic lymphagenitis are, resolution, the acute state, and suppuration. — *a. Resolution* takes place slowly or imperfectly; and, although inflammatory engorgement may be more rapidly removed, the infiltrated lymph, or deposit in the gland, is very slowly removed. — *b.* An *acute state* of vascular action may be induced by external injury, by increased irritation affecting the related lymphatics, or by too great exertion of the neighbouring muscles or parts. When this change occurs, the usual phenomena of an acute attack (§ 43.) are observed.—*c. Suppuration* is generally a consequence of the acute state of the disease following the chronic. When suppuration is about to take place, the surrounding cellular tissue becomes infiltrated and swollen, and the gland more tumefied, less hard, and less moveable, the formation of matter in these cases taking place around, and rarely within, the gland.

48. *C. Specific Inflammation of Lymphatic Glands — Lymphadenitis specialis.* — Lymphadenitis may occur in the course of various malignant and constitutional maladies, and present, in these circumstances, either an acute or chronic form. — *a.* It may appear in an *acute form*, in the course of *malignant* or *putrid continued fever*; and it is always distinctive of *plague*, or pestilential fever. In these circumstances, the affection of the glands is of an extremely asthenic or disorganizing nature. It also occurs consequent upon the inoculation or absorption of various contaminating and septic poisons, and of putrid animal matter or fluids, where it assumes more or less of the same asthenic characters. — *b.* It generally assumes, or passes from the acute into, the *chronic form*, when produced by *syphilitic* ulceration or absorption. The continuance of *carcinomatous* or other local malignant disease induces a chronic form of enlargement and alteration of the lymphatic glands, which can hardly be attributed to inflammation, but either to the deposit of morbid matter in the substanceof the gland, or to the accumulation of it in the extreme ramifications of its vessels, this matter being identical with, or similar to, that present in the primary seat of disease, and altering the size, functions, and appearances of the gland. Of other changes and more remote consequences of diseases of lymphatic glands, further notice will be taken in the sequel.

49. *D.* Causes.—The *causes* of Lymphadenitis are diversified. — *a.* They generally operate either through the medium of the constitution, or locally; and in many cases, the local causes are enabled to produce their effects on the gland, owing to a *state of the constitution* predispossng it to the affection. In most of the symptomatic and specific forms of lymphadenitis, the disease is chiefly owing to antecedent changes in the state of the circulating fluids and of the vital cohesion of the soft solids generally. In such circumstances, the local agents, whether merely irritant, or also contaminating, readily produce disease of glands corresponding to the primary seat of irritation or of inoculation.

50. *b.* The *local causes* are those — 1st, which act directly on the gland, as contusions, wounds, and other injuries; and 2d, those which act through the medium of related absorbent vessels. Numerous causes act in this latter way; punctures, abrasions, injuries, &c., may inflame the insorbents, and the inflammation may extend to the nearest glands to which these vessels proceed; or the local injury may be so slight as hardly to be remarked, and yet the gland corresponding to the part may become inflamed, the vessels communicating with the one and the other being apparently unaffected. Various morbid matters may even be inoculated in this way, and the matters may inflame these glands either after the vessels have been affected, or without having sensibly involved the lymphatics communicating between the seat of injury and the gland. Thus putrid or morbid animal matter may be introduced without producing any obvious local disease until the glands are affected. Certain maladies, also, which commence locally, do not produce inflammation of the lymphatic vessels conveying the morbid matter, whilst they generally affect these glands to which the vessels proceed, the absorbed matters inflaming these glands but not the trunks of these vessels. This is illustrated by the phenomena of syphilis and cancer.

51. *E.* Treatment.—*a.* The treatment of *acute lymphadenitis* should depend very much upon the state of the constitutional powers. When the disease assumes a purely *sthenic* character, local bloodletting freely prescribed, and promoted by the usual means, is always necessary; but, in order to procure the resolution of the disease, it should be resorted to early, and before the integuments have become red, or other indications of suppuration have appeared. M. Velpeau has advised the application of blisters to the surface of the part, in order to procure resolution; and subsequently poultices or mercurial ointment. In strong or plethoric persons, these means should follow copious local depletion. If the disease appears in a cachectic state of the system, or with signs of *asthenia*, local depletions are rarely of service. In these cases, particularly as I have frequently seen them consecutively upon scarlet and other fevers, alteratives in conjunction with tonics have proved most beneficial, tending to limit both the extension of the disease and the consequent amount of suppuration, which, in these circumstances, can rarely be prevented; but, even in these, the amount of disease and its duration will be greatly lessened by the exhibition of the liquor potassæ, or Brandish's alkaline solution, with or without the iodide of potassium, in the decoction of cinchona and tonic tinctures, or in the preparations of sarsa. At the same time, the secretions and excretions should be promoted by means of alterative and chologogue aperients, and stomachic purgatives.

52. If suppuration appear inevitable, poultices should be applied, and as soon as any fluctuation can be detected, an opening should be made, and the discharge of matter promoted by a continuance of the poultices; the constitutional means being prescribed with strict reference to the state of general and local action, and to the functions of the abdominal viscera. In these cases, as well as in many others, the principles of treatment fully developed and illustrated in the articles Abscess and Inflammation should be adopted.

53. *b.* The *treatment of Chronic Lympha-*

denitis consists chiefly of the application of leeches in some cases, and the occasional repetition of them, of the exhibition of alteratives and tonics, as liquor potassium, iodide of potassæ, the iodide of iron, sarsa, cinchona, &c.; of frictions with resolvent or deobstruent ointments and liniments, and of salt-water bathing, &c. In all cases of the chronic disease, particularly in scrofulous persons, and of the acute, after the active symptoms have been subdued, change of air, alterative mineral waters, a cautious use of the iodides in small doses, or the combination of certain of them with the liquor potassæ, sea-bathing, and sea-voyaging, change of climate, the tepid shower-bath or douche, a moderate or limited use of animal food, with a sufficient amount of vegetables and farinaceous diet, and a very liberal use of new milk, whey, or fresh buttermilk, as a common beverage, will generally secure recovery and prevent future attacks.

54. *c.* The *specific states of Lymphadenitis* require few remarks. When the disease assumes an *asthenic* or malignant nature in connection with similar constitutional maladies, the powers of the system should be promoted, and energetic general and local means should be employed in order to resist the progress of the local mischief. Powerful tonics, antiseptics, and alteratives should be employed, according to the symptomatic relations of the disease; but it is unnecessary to particularise these remedies at this place, as they are fully noticed in the articles ABSCESS (§ 62.), INFLAMMATION (§ 238. *et seq.*), PESTILENCE, SCROFULA, and SYPHILITIC CACHEXIA.

ii. STRUCTURAL CHANGES OF LYMPHATIC GLANDS.

CLASSIF. — IV. CLASS. II. ORDER (*Author*).

55. These changes are chiefly seated, 1st, in the cellular tissue uniting the convolutions of the lymphatics; and, 2d, in the lymphatics themselves; and occur most frequently in infancy and childhood, when these glands are most developed, and their functions most active. Dr. BOEKER considers that, in diseases of these glands, the cellular tissue uniting the convolutions of the lymphatics are most frequently affected, and that there is seldom obstruction of their canals, as he has found injections to pass freely through them.

56. *A. Simple enlargement* of these glands is often observed. It generally arises from causes not originally seated in the glands, but from irritation at the origin of the lymphatics passing through them, or from the irritating nature of the fluids which they contain. Thus we perceive painful swellings of the glands of the groin or arm-pit follow punctures or lacerations of an extremity, or the inunction of mercury; and a similar effect is produced on the glands under the jaw, on those adjoining the trachea, and on the mesenteric glands, from sores in the mouth, inflammation of the bronchial lining, and from irritation of the digestive mucous surface, respectively. When the irritating cause is not of a specific or poisonous nature, the effect upon the glands is merely that of irritative enlargement, or of healthy acute inflammation, or the latter following the former change. But when a specific cause of a noxious or poisonous nature has affected the absorbents or been conveyed into the lymphatic circulation, a specific and more noxious effect is the result. On each of these I shall offer a few remarks.

57. *B. Inflammation* is frequently met with in these glands, in the acute, the chronic, or intermediate states. (See § 42. *et seq.*) When thus affected they are more or less red, tumefied, and readily broken down. In the more chronic state of inflammation they are considerably enlarged, hardened, and either become colourless or acquire a darker tint. Inflammation, in its more active forms, is often followed by the formation of purulent matter, which either infiltrates the tissue of the gland, giving it a dirty grey colour, or is disseminated in small distinct drops, or is collected into an abscess. When this last occurrence takes place it often occupies the whole of this gland, destroying its parenchymatous structure; its envelope alone remaining and forming the cyst to the abscess (§ 45.).

58. *C. Scrofulous enlargement and inflammation* are generally of a chronic kind; the gland swells and softens, and occasionally becomes redder; and, although the suppuration does not rapidly supervene, yet this termination is frequent, is peculiar in its nature, and takes place, in many cases, without any signs of inflammation of the gland itself, although the surrounding cellular tissue and the skin become subsequently inflamed and softened, followed by perforations, through which the scrofulous secretion from the gland is evacuated. This form of disease is generally unattended by pain or tenderness, and the cellular tissue and skin are affected. As the gland softens, a particular part or parts, generally about its centre, are converted into a sero-albuminous fluid; and this change invades more or less of the gland, extending to the surrounding texture, occasioning perforation, and the discharge of a serous fluid containing curd-like matter. On examination, the gland presents the appearances described in the following paragraph (§ 59.); and sometimes merely a more friable state of its structure, with cells or cavities containing a partly serous and partly puriform fluid, and a white, albuminous, or curdled matter (see article SCROFULA). In some rare cases, scrofulous glands when inflamed become rapidly *disorganised;* sloughing of the cellular texture surrounding them and of the skin takes place; the gland assumes an unhealthy ash colour, and is at last expelled either in shreds and pieces, or in a sphacelated mass. This change has been noticed, by CRUICKSHANK and CRAIGIE, to occur in scrofulous persons, generally about the bend of the arm, and is evidently depending on a debilitated and cachectic state of body.

59. *D. Tubercular matter* is found very frequently in the lymphatic glands, and generally either infiltrated and disseminated through their tissue, or collected into one or more masses of various sizes. In respect of the production of this matter, the question is, whether it is, or is not, the result of inflammation. The developement of tubercle subsequently to inflammation is, as remarked by M. ANDRAL, undoubtedly exhibited in lymphatic glands; but though in many cases the tuberculated gland presents unequivocal marks of antecedent congestion or inflammation, it is not the less true that in several instances there exists no evidence whatever of the formation of the tu-

bercular matter having been preceded or accompanied by any vascular injection.

60. Tubercular matter, as found in the lymphatic glands, has generally been viewed as the product of secretion, not necessarily of inflammatory secretion, but rather itself occasioning the inflammatory appearances frequently associated with it. M. Andral observes respecting this point: perhaps it may yet be considered as simply the result of an alteration of the lymph itself, either spontaneous, or caused by a morbid condition of the lymphatic vessels, or perhaps resulting simply from its stagnation caused by some mechanical obstacle to its circulation through the lymphatic plexus. I am disposed to adopt a part of this explanation, and to infer, that the tubercular matter proceeds simply from diminished vital energy of the glands affected, occasioning stagnation of the circulation through the convolution of lymphatics; and consequently a morbid state of the lymph and all the other phenomena attendant on tubercular formations, as inflammation, scrofulous suppuration, &c. alternately supervene.

61. *E. Pestilential disease of lymphatic glands.* (§ 47.) From the first twelve hours to the seventh or eighth day of plague, the glands in the armpits and groins become enlarged, and give rise to an open sore, accompanied with sloughing, and the discharge of a foul, dirty-coloured fluid. The texture of the gland seems softened, of a dark grey, greyish brown, or brownish-red colour; becoming rapidly disorganised and wholly destroyed, especially in the fatal cases. This state of the glands is often associated with carbuncles, to the irritation occasioned by which it has been imputed. But this is evidently not the case, as the lesion of the glands often commences as early as the formation of carbuncles, or even precedes it. Both lesions evidently depend upon the same cause, namely, to a certain change of the vital condition of the parts affected, deranging the capillary circulation in the one, and the lymphatic circulation through the glands in the other, and changing the states of the fluids circulating through each system of vessels respectively, and inducing the ulterior changes characterising both.

62. *F. Disease of the glands from the absorption of noxious matters* is not infrequent. The effect produced by these matters on the glands varies very considerably, owing — 1st. To the nature of the injurious cause; and 2d. To the constitution and state of the vital energies of the patient at the time. *Phagedenic bubo* is one of the most common effects proceeding from this source. It is occasioned by the syphilitic poison, or by repeated or too long continued courses of mercurial inunction, especially when acting on an unhealthy state of the body. Hence these noxious matters excite inflammatory action of an asthenic or diffusive kind, in the gland, extending to the capsule, and surrounding cellular structure; and these parts become painful, hard, somewhat hot, and of a brownish red. The skin passes from this tint to a dirty greyish brown, loses its vitality, and, with the cellular tissue underneath, alternately ulcerates and sloughs. The glands, however, still remain undestroyed, generally enlarged, and of a brownish-red or purple colour, and evincing a very low grade of vitality, until the destruction of the surrounding tissues isolates them more or less completely, when they are thrown off in the state of slough.

63. *G. Enlargement and destruction* of the glands sometimes follow the *inoculation* and *absorption* of putrid or poisonous animal secretions or fluids, as in wounds from dissection, and the bites of poisonous reptiles. In cases of this kind, the noxious matters contaminate the lymph circulating through the gland, the vitality and circulation of which become greatly injured, and rapid disorganisation is thereby occasioned, extending to the adjoining structures, and in the course of the lymphatics departing from thence. In cases of this description the gland rapidly softens and enlarges, loses its healthy colour, and assumes a dark and foul appearance, and ultimately sphacelates either in part or altogether.

64. *H. Induration* of the lymphatic glands is frequently met with in consequence either of repeated attacks of chronic inflammation alternating with partial resolution, or of the continued irritation in a part whence the lymphatics passing through the gland originates. This disease is not infrequent in strumous habits, and is characterised by a very slight, or entire absence of, pain in the gland. When examined with the scalpel the gland is enlarged, hardened, so as often to grate when divided, and presenting a whitish tissue, with a very few red vessels, the remains of its natural vascularity.

65. *I. Schirrous induration* may proceed from the same causes as simple induration, particularly in persons advanced in life; or from schirrous disease in the part in which the absorbents of the gland originate. When divided, the gland is observed to be very slightly vascular — less so than natural; very much hardened, of a bluish grey, or greyish white colour, somewhat elastic, and consisting of gelatinous and amorphous matter traversed in every direction by dense cellular or fibro-cellular tissue, of a lighter colour than the matter traversed by it. This lesion is often accompanied with a dull pain, which is sometimes exasperated, in the substance of the gland. (See art. Cancer.)

66. *K. Cancer* is met with in the lymphatic glands, but it very rarely occurs primarily; it is commonly consecutive of this malady in adjoining or related structures. It assumes in the glands similar forms to those presented by it in other parts. It is *characterised* by exacerbations of pain in the enlarged and hardened gland, by the absence of tenderness, the very chronic state of the disease, an unhealthy or cachectic habit of body, and mature or advanced age. The gland when divided is vascular, indurated, of a reddish brown hue, and its tissue is converted into a dense fibro-cellular substance with cells containing a granular amorphous matter. When the gland passes generally or partially from this state to that of softening and ulceration, with an acrid, foul secretion, irregular fungous excrescences springing from the disorganised surfaces, *carcinoma* of the gland has taken place. (See Cancer.)

67. *L. Fungus Hæmatodes* of the lymphatic glands is rare. Mr. Wardrop observed this change in the mesenteric glands. I met with one case of it in the absorbent glands in the groin, in a boy of about thirteen years of age, who had a number of hæmatoidal tumours in different parts of his body. The structure of these glands was

similar to that described under the article FUNGO-HEMATOID DISEASE).

68. *M. Melanotic depositions* sometimes take place in the lymphatic glands. But this lesion should be distinguished from the dark discolouration which is occasionally met with, without any organic change. (See MELANOSIS.)

69. *N. Calcareous and osseous deposits* in the lymphatic glands have been described by CRUICKSHANK, BAILLIE, GOODLAD, DUPUY, RAYER, and ANDRAL, and are stated to occur most frequently in the tracheo-bronchial glands; and in persons advanced in life. I have, however, met with this change previous to puberty, both in the bronchial and mesenteric glands; and M. ANDRAL mentions a similar case. This pathologist refers to cases which occurred to him and to M. REYNAUD, in which the presence of bony and calcareous deposits in the glands was coincident with destruction of some of the bones, leading to the inference that the calcareous phosphate which had been absorbed from the seat of disease in the bones had been deposited in the lymphatic glands. In cases of this description the calcareous deposits are frequently not limited to the glands, but are found also in the lungs.

iii. LESIONS OCCASIONED BY DISEASED LYMPHATIC GLANDS.

70. These glands, when enlarged or otherwise diseased, may derange the functions or structure of adjoining parts, either communicating irritation or occasioning mechanical pressure, or interrupting the circulation of lymph in the lymphatics, and causing swelling of the parts whence they arise. The bronchial glands have been found enlarged so as to impede the passage of air into the lungs, and even to give rise to atrophy of the portion of lungs the functions of which had been obstructed. They may also occasion inflammatory irritation of the part of the bronchus pressed upon, leading to perforation; and, if the enlarged gland contain pus or tubercular matter, these may be evacuated into the bronchial tube and excreted; and, even recovery may take place, more rarely, however, if the gland contain tubercular matter, inasmuch as the glands seldom contain this matter unless it exists also in the substance of the lungs.

71. Enlarged lymphatic glands in the vicinity of the pylorus may compress the passage so as to occasion a great proportion of the symptoms attendant on scirrhus of this part. Or they may compress the hepatic duct and occasion jaundice; and they may similarly affect the cystic and common ducts. A case occurred to me in 1821, in which the common and pancreatic ducts were so compressed by a cluster of enlarged lymphatic glands as entirely to obliterate their canals: the patient died jaundiced, and the gall-bladder and hepatic ducts were enormously distended by dark-coloured bile. M. ANDRAL has seen the gall-bladder itself obliterated by these glands. In some cases, the ureters have been found obstructed by pressure sustained from them, and even the vena cava has been so compressed by them, and its circulation so impeded, as to occasion great œdema of the lower extremities.

72. Chronic inflammation and induration may interrupt the circulation of lymph through them, and hence occasional swelling or œdema of the parts from which they arise; but this does not so frequently occur from simple induration or scrofulous inflammation or deposits as from schirrous induration or malignant deposits.

73. When the glands of the axilla and parts adjoining become indurated and enlarged consecutively upon cancer mammæ, they may be so impervious to the transmission, by the lymphatics, of lymph and serum from the arm, as to cause remarkable swelling and œdema of it. Enlargement and obstruction of the glands of the groin may have a similar effect upon the lower extremities, — an effect which I have seen on several occasions, in both the upper and the lower limbs. Some years ago I was consulted by a medical gentleman on account of a tumour, seated internally above the abdominal ring of the right side, which was large and painful. The testicle on that side had never descended. A treatment suitable to inflammatory enlargement of the gland — namely, local blood-letting and antimonials, followed by the iodide of potassium, with liquor potassæ, &c. — was prescribed, and he derived benefit from it. A considerable time afterwards I was again consulted by him. The tumour had returned; the lymphatic glands in the groin of the same side were greatly enlarged and inflamed, and the right thigh and leg were swollen and painful, resembling the state of the limb in phlegmasia alba dolens. In this case there were manifestly inflammatory enlargement of the undescended testes, and of the glands in the groin, with interrupted circulation through the latter, occasioning infiltration of serum and lymph in the thigh. The enlarged testes and lymphatic glands probably also pressed upon the veins so as to impede the return of blood through them. (See art. SCROFULA.)

BIBLIOG. AND REFER. — *Russel*, Œconomia Naturæ in Morbis Acutis et Chronicis Glandularum. 8vo. Lond. 1755. — *Diedrich* De Morbis Glandularum. Lips. 1759. *G. Hewson*, Experiment. Inquiries, part ii., containing a Description of the Lymphatic System, &c., with Observations on the Lymph and the Changes it undergoes in some Diseases, &c. 8vo. Lond. 1774. — *Sœmmering*, De Cognitionis subtilioris Systematis Lymphatici in Medicina Usu 4to. Cassel, 1779; — et De Morbis vasorum Absorbentium. 8vo. Francf. 1795. — *E. Darwin*, Exper. on Mucilag. and Purulent Matters; and an account of the Absorb. Vessels in some Diseases. 8vo. Shrews. 1780. — *Assalini*, Essai Médical sur les Vaisseaux Lymphatiques. 8vo. Turin, 1787. — *Wrisberg*, In Comm. Soc. Reg. Scient. Gotting. t. ix. 1789. — *C. F. Ludwig*, Physiol. et Pathol. de Systemate absorbente recent. quædam Decreta. 4to. Leips. 1789. — *Pujol*, Essai sur les Malad. propres à la Lymphe et aux voies Lymphatiques, in Mém. de la Société Roy. de Méd. t. vii. and viii., 1791, et Œuvres, t. i. p. 224. — *Salmade*, Précis d' Observat. pratiques sur les Maladies de la Lymphe. 8vo. Paris, 1803. — *Attenhofer*, Lymphatologia; oder Abhandl. über das Lymphatische System und dessen Leiden. 8vo. Vien. 1808. — *A. Ramsay*, in Edin. Med. and Surg. Journ. vol. viii. — *D. Pring*, An Essay on the Absorbents, comprising some Observat. on the relative Pathology and Functions of the absorbent and secreting Systems. 8vo. Bath, 1813. — *W. Goodlad*, A Practical Essay on the Diseases of the Vessels and Glands of the Absorbent System. 8vo. Lond. 1814. — *Howship*, Pract. Observat. in Surgery and Morb. Anatomy. Case 94. — *G. Breschet*, in Dict. des Sc. Méd. t. xx. p. 196. — *Allard*, Du Siége de la Nature des Maladies. 8vo. 2 vols. Paris, 1821; et De l'Inflammation des Vaisseaux Absorbants. 8vo. Paris, 1824 — *Lippi*, Journ. des Progrès de Sciences Médicales, t. i. p. 167.; t. ii. p. 27.; t. iii. p. 108. — *Rossi*, in Ibid. t. ii. p. 20. — *Lasserre*, in Journ. Univers. de Méd. t. xxiv. p. 5. — *Andral*, in Archives Génér. de Méd. t. vi. p. 502.; et Anat. Patholog. t. ii. — *Benedict*. Remark. über die Krankh. der Brust und Achsel-Drüsen. 4to. Breslau, 1825. — *F. G. Becker*, De Glandulis Thoracis Lymphaticis, atque Thymo, Specimen pathologicum, &c. 4to, Berlin, 1826. — *T. Fideli*, De Lymphangioitide, ejusque Formis Diversis. 8vo. Patavii, 1825. — *Gendrin*, Histoire des Inflammations. 8vo. Paris, 1829. — *W. Cullen* and *R. Carswell*, in Transact of Med. and

Chirurg. Soc. of Edin. vol. i. — *J. E. Dezeimeris*, in Archives Génér. de Médicine, t. xxii. p. 5. — *Amussat*, in Ibid. t. xiv. p. 111. et t. xxi. p. 608.; et *Lippi*, in Ibid. t. xx. p. 612. — *Cruveilhier*, Anat. Pathol. du Corps Humain. Livr. xi. — *Kastner*, Das Weisse Blut; in Physiol. Pathol. Bezichung Betracht: &c. Erlung. 8vo. 1832. — *Dubled*, in Amer. Journ. of Med. Sciences, vol. vi. p. 216. and 220. — *A. Velpeau*, Mém. sur les Mal. du Système Lymphatique, in Archives Génér. de Méd. 2d Ser. t. viii. p. 129. et 308.: et Seconde Mém. Inflammation Aigué des Ganglions, Ibid. t. x. p. 5. — *Velpeau*, Brit. and Foreign Med. Review, Oct. 1836, p. 556. — *G. Breschet*, Le Système Lymphatique, Thèse de Concours pour une Chaire d'Anat. 4to de Paris, 1836. — *Ollivier*, in Dict. de Méd. 2d edit. art. *Lymphatiques, Pathol.* — (See also the works on Pathological Anatomy by Portal, Baillie, Voigtel, Meckel, Otto, and Andral.)

MALARIA. — See Endemic Influences.

MAMMA, DISEASES OF THE. — As these diseases come chiefly under the cognizance of the surgeon, a brief notice of them only will be required in this work. Diseases of the breast are either *malignant* or *non-malignant*: this distinction, however, must only be adopted as a general one, for tumours which have long existed in an indolent state, occasioning no serious symptoms, may become malignant under the influence of constitutional disease, of the changes accompanying the cessation of the menses, and of depressing passions of the mind. Sir A. Cooper, admitting this limitation, distributes diseases of the breast into three classes: — "1st. Those which are the result of common inflammation, acute or chronic; — 2d. Those which arise from peculiar or specific action, but which are not malignant, and do not contaminate other structures; — 3d. Those which are not only founded on local, malignant, and specific actions, but are connected with a peculiar and unhealthy state of the constitution."

2. M. Velpeau divides diseases of the Mamma into — 1st. *Inflammations* and their consequences; and 2d. *Tumours* of various kinds. Both these divisions are defective; for there are affections of the mamma, which consist neither of inflammation nor of tumour but which are functional and nervous. These have hardly received sufficient attention from systematic writers; indeed, with a few exceptions, they have not even been noticed; and, when noticed, but imperfectly. The circumstance of their being very commonly sympathetic, either of disorder of the uterine functions, or of pregnancy, should not excuse this neglect, since they do not always depend upon this cause; and even when they are so associated, they are often the most prominent and distressing part of the disorder. I shall, therefore, divide the affections of the mamma into — 1st. Functional and painful disorders; — 2d. Inflammations and their immediate consequences; — 3d. Tumours and morbid growths not primarily or generally malignant and contaminating; — and, 4th. Tumours or formations of a malignant and contaminating nature.

3. I. Functional and painful Affections. — The *functions* of the mamma may be either imperfectly or not all performed, at the period when they are destined by nature to be discharged, or, after they have commenced at this period, they may suddenly and entirely cease. These functions may likewise be performed in an excessive manner, either absolutely or relatively to the constitutional powers of the nurse. With the exception of *deficiency and suppression of the milk*, and of *painful affection of the mamma*, the other functional disorders of this organ are treated of in the article Lactation.

i. Deficiency or Suppression of the Milk. — Syn. *Agalactia*, *αγαλακτια* (from *α*, priv., and *γαλακτος*, milk). *Agalactie*, Fr. *Der Mangel un Milch*, Germ.

Classif. — I. Class. II. Order (*Author*).

4. Defin. — *The non-appearance or the suppression of the function of the mamma, at the period intended for the performance of it.*

5. After parturition, the *function* of the mamma is generally discharged with more or less activity; but it may not be manifested; or, having been performed for a time, it may prematurely or quickly cease. This non-performance of the office of the organ may be either *primary*, or *consecutive* and symptomatic, more frequently the latter.

6. *A. Primary agalactia* is generally *caused* by powerful mental emotions; by constitutional debility; by want, misery, and starvation; and particularly by cold applied to the body generally, or to the mammæ more especially, in connection with inanition. When it proceeds from mental emotions, the disorder is often only of temporary duration; but when it arises from other causes, it is generally permanent.

7. *B. Sympathetic agalactia* is often consequent upon fever and inflammations occurring after delivery, or at any period of lactation, more particularly upon peritonitis, hysteritis, and excessive discharges, &c. When these diseases appear soon after parturition, the mammæ do not become full and enlarged, as usually observed at this period, but are flaccid, and secrete little or no milk; the elements of which, thereby accumulating in the circulation, favour the production of effusion in the seat of inflammation. If the disease, of which agalactia is the consequence, is severe, or continue for any considerable time, the function of the mamma is rarely resumed; but if it be slight, or of short duration, the milk returns to the breast with the subsidence of the malady.

8. The *diagnosis* of agalactia should not be overlooked; and the affection, whether primary or symptomatic, should not be confounded with the retention of the milk caused by inflammation of the mamma, and by obstruction of the lactiferous ducts. In these cases, the mamma is hard, painful, and swollen; and the excretion, rather than the secretion, of milk is impeded or interrupted.

9. The circumstance of partial or complete agalactia being sometimes concealed by nurses, particularly by those who are hired to suckle, should be kept in recollection; and, where the infant presents any indication of insufficient nutrition, or is peevish, irritable, and dissatisfied when applied to the breast, the state of the mammæ should be ascertained.

10. The *consecutive states* of agalactia, and the *treatment* of the affection in its several forms, are fully stated in the article Lactation (see § 18. *et seq.*).

ii. Painful Affection of the Mamma. — Syn. *Mastodynia* (from *Μαστὸς*, mamma, and *ὀδυνη*, pain). *Der Schmerz in den Brüsten*, Germ. *Mastodynie, Douleur des Mammelles*, Fr.

Classif. — II. Class. I. Order (*Author*).

11. DEFIN. — *Pain, more or less severe, in one or both mammæ, most frequently in one only; generally recurring, and with local heat, or general fever.*

12. Painful affection of the mamma is most frequent during the early months of pregnancy, and in connection with functional disorder or organic disease of the uterus and ovaria. In its slighter forms, it sometimes accompanies the irregular appearances of the catamenia soon after puberty, and suppression of the discharge, either then or at later epochs. Complete or violent neuralgia of the mamma is rare, but less severe pains are not infrequent in nervous and hysterical females, and in those who are the victims of tight lacing, especially when the uterus or ovaria are the seat of irritation, or in the circumstances just alluded to.

13. *a.* When the affection is purely *nervous*, it is *characterised* by the nervous temperament, and hysterical tendency; by the recurring, and even periodic, form; and by the absence of local or general plethora, and of hardness or fulness of the organ. In these cases, the left mamma is more frequently affected than the right. When it depends upon congestion of, and vascular determination to, the mamma, the pain is more continued, although attended by exacerbations; and it is more liable to occur in this form in sanguine and irritable temperaments, in females of a full habit, and in the course of pregnancy and suppression of the catamenia, than in other circumstances. M. CAPURON remarks that this affection may be so severe in irritable females, as to cause agitation, sleeplessness, and delirium. In those of a full habit, the mammæ sometimes become full and somewhat hard, and the pain is more obviously connected with distension of the fibrous envelope of the gland, both mammæ being more frequently affected than one only. Females who have experienced pain in the mammæ before marriage, generally have a return of it afterwards when they become pregnant; and it may continue for a considerable time, or recur at intervals. If it be attended by congestion or vascular determination, these are liable to encrease as the period of parturition approaches; and in plethoric females it may terminate in inflammation and abscess after delivery.

14. *b. Diagnosis.* In all cases of pain in the mamma, the state of the organ should be carefully ascertained, as respects the existence of inflammation or of tumour. The former will be indicated by local heat, fulness, tenderness, and fever; and when these are absent, and no tumour exists, the state and functions of the uterus require attention. This affection of the mamma rarely occurs unconnected with some change in the state of the uterus and its appendages, or with pregnancy; and this latter should be suspected when the pain is associated with suppression of the catamenia. The pain may, however, occur before this discharge has made its appearance, and it may be the first indication of the accession of this change of female life.

15. *c. Treatment.* The *indications* of cure should be entirely based upon the *associations* of the complaint, particularly with the states of the uterus. If this organ is the seat of obvious disorder or actual disease, the treatment should be directed chiefly to the removal of such disorder. The pain in the mamma is here merely a symptom of the uterine disease. If it be consequent upon pregnancy, it is equally a symptom, and one which requires palliatives only,—but these should not be neglected, as a persistence of the affection may excite fever, or other disturbance of a serious nature. In this case, anodyne fomentations, cooling aperients, narcotics given so as to procure repose, gentle frictions of the mamma with soothing or powerfully anodyne liniments, and belladonna and camphor plasters, are the most appropriate means. If the patient be plethoric, and the mamma full and tense, a small or moderate blood-letting, and diaphoretics, as DOVER's powder, the liquor ammoniæ acetatis with spiritus ætheris nitrici, antimonials, &c., are the safest remedies.

16. If the affection present a *nervous character*, the circumstances tending to increase the nervous disposition should be avoided. These, however, the physician often can only suspect; and certain of them he can hardly mention, although there is no doubt of their having induced and prolonged the disorder. Local excitement, mental emotion, a heated imagination, tight lacing, &c., are all often more or less concerned in producing the complaint, whether it appears at the period of puberty or at later epochs; and, when this is the case, the treatment frequently fails, if it be not assisted by an abandonment of the cause. In this state of the disorder, however, the local means above mentioned (§ 15.) should be aided by such as will regulate or promote the catamenia, or subdue uterine irritation, and by those which will restore the impaired tone of the nervous systems and of the organic functions,—especially by camphor, sulphate of quinine, the sulphate of iron, and anodynes. The preparations of iodine, the iodide of potassium with liquor potassæ, the iodide of iron, and the various chalybeate preparations and mineral waters, may be prescribed, particularly when the uterine functions are disordered, or when the blood is deficient in quantity or in Hæmatozine.

II. INFLAMMATIONS OF THE MAMMA. — SYN. *Mastitis* (from *μαστός*, mamma); *Mastoitis; Inflammation des Mammelles, Mastoite,* Fr. *Entzündung der Brüste,* Germ.

CLASSIF. — III. CLASS. I. ORDER (*Author*).

DEFIN. — *Pain, tenderness, and tension of the mamma, with febrile commotion.*

17. i. INFLAMMATION OF THE NIPPLE. — Various inflammatory affections are confined or extend to the nipple, and occasion, when neglected, unpleasant or painful effects. The chief of these are simple *excoriations, eczematous* and other eruptions, *cracks, fissures,* and *ulcerations.* Sore or inflammatory states of the nipple are very frequent, and are often a source of great distress. They are most common with first children, but some women suffer from them after all their confinements. Inflammatory appearances are seen two or three days after the application of the infant to the breast, and continue with further changes for an uncertain time. — *a.* At first the nipple and areola are dry, rough, red, and harsh, and then excoriated, humid, minutely granulated, often minutely cracked, chapped, or fissured, especially at the base of the nipple, and acutely painful. When the excoriation is considerable, a serous discharge is poured out, and extends the excoriation to the surrounding skin. In more severe cases the nipple exhibits two or three deep fissures, and these may become so extensively

ulcerated as to be partly or even altogether destroyed. In most of these, suckling not only aggravates the symptoms, but also causes the sores to bleed, and occasions extreme torture. When the sores prevent the sufficient application of the child to the breast, the consequent accumulation of milk occasions distension and inflammation of the mamma.

18. *b.* The *causes* of sore nipples are chiefly the too frequent application of the infant to the breast, thereby occasioning the removal of the protecting sebaceous secretion of the part, and favouring inflammatory irritation, vascular injection, and its usual consequences. The constitution, habits, and modes of living of the patient, particularly the use of irritating and exciting articles of diet, and of heating beverages, also favour the occurrence of this affection. The state of the child's mouth, tongue, and gums, more especially aphthæ of these, frequently affects the nipple; whilst, on the other hand, the discharge from the sores of the nipple often inflames the mouth of the infant.

19. *c. Treatment.* In order to *prevent* this affection, Dr. Churchill advises the nipples to be washed with soap and water, and dried, and afterwards bathed with spirit and water, night and morning, during the last month of pregnancy. Sir A. Cooper suggests washing the nipples some time before lying-in with strong brine, in order to harden the cuticle, and render it less prone to crack. Dr. Burns states, that a combination of white wax and butter is often useful; and that stimulating ointments, such as the unguent. hydrarg. nit. diluted with axunge, are sometimes of service; or that the parts may be touched with burnt alum or nitrate of silver, or dusted with some mild dry powder. Some physicians prescribe solutions of alum; some, solutions of sulphate of zinc; and others, the supernatant liquor of a mixture of lime-water and the chloride of mercury. One of the best applications is a solution of a drachm of borax in four ounces of water and half an ounce of spirit of wine, or in equal quantities of water and dilute acetic acid. Pure and fresh *palm oil* is one of the most efficacious applications to the nipple, and the safest to the infant; it need not be washed off previously to applying the child to the bosom, unless it be made the vehicle for other substances. Several writers advise, particularly when chaps, cracks, or fissures exist, a weak solution of the nitrate of silver to be applied after each period of suckling; the nipple being washed before the infant is again held to the breast. Various mechanical means have been employed where fissures, ulcerations, &c. exist. Shields, with prepared cow's teats, are the best of these. Feeding the infant two or three times a day, or a temporary recourse to a nurse, will facilitate the cure; but the milk should not be allowed to accumulate, lest inflammation of the breast itself supervene.

20. ii. Acute Inflammation of the Breast. — *A.* The *symptoms* of this disease are nearly those which characterise acute inflammation of other glandular parts, somewhat modified in their progress and results by the peculiar functions and relations of the organ. Sir A. Cooper describes an adhesive, a suppurative, and an ulcerative stage, the existence of each of which is readily recognised during the progress of the disease. The severity of the symptoms depends upon the principal seat and extent of the inflammation. When the cellular tissue and skin are alone involved, local pain, soreness, with circumscribed hardness and tension, are felt, with slight inflammatory fever. But when the gland itself, its connecting cellular tissue, and the fascia are implicated, the pain is then very severe, and extends to the axilla: the swelling is then more general, and more considerable, the tension greater, and the fever more intense; the skin being hot, the pulse quick and full, with thirst, headache, sleeplessness, &c. If the gland be generally inflamed the breast has an irregular or nodulated feel, as if consisting of several tumours. The secretion of milk is suspended, at least for a time; but it generally takes place after the acute stage has subsided. In this, the *adhesive stage*, lymph is effused into the interstices of the inflamed tissues, and a hard and exquisitely sensitive swelling is produced.

21. After a while an inflammatory blush appears on the surface, the pain becomes throbbing and very intense, rigors or chills, succeeded by heat and perspiration, indicate the formation of pus; a particular portion of the tumour, commonly where the surface was first red, becomes smooth and prominent, and fluctuation is sensible to the touch. Detachment of the cuticle follows, with *ulceration* of the cutaneous textures, and discharge of matter. The whole process usually occupies from ten days to three weeks; but its duration depends upon the intensity of the inflammation, the constitution of the patient, and the depth of the abscess.

22. The *pointing* of abscess of the mamma is generally near the nipple; and when the abscess is superficial, or implicates chiefly the cellular tissue, the matter discharged consists of digested pus, usually contained in only one cyst or cavity; but when it is more extensive, invading the gland and fascia, the matter is sometimes contained in several cavities, and sloughs of cellular tissue occasionally are discharged. In a healthy person, the abscess soon heals up after the matter has been completely discharged; leaving only some hardness for a time.

23. In scrofulous constitutions, however, or in cachectic habits, and in persons whose minds have been harassed, and vital energies depressed, or circulating fluids contaminated, by absorption of morbid secretions from the uterus, or by residence in an ill-ventilated or crowded hospital, a much more severe, rapid, or even a more protracted disease presents itself. Recurring chills or rigors, followed by heat and perspiration; œdema of the surrounding parts, deep-seated fluctuation, or diffused suppuration; low or adynamic fever; and extension of an asthenic form of inflammation to adjoining parts, with the usual ill-consequences, either endanger, or carry off, the patient. In the more protracted cases, suppuration takes place slowly, an abscess forms, bursts, reforms in the vicinity, opens, and extends; and is ultimately followed by sinuses, hectic fever, and its usual attendants.

24. *B. Causes.* According to Sir A. Cooper, the chief cause of this disease is the rush of blood to the breast every time the infant is applied, and which affords the secretion of the organ. It is doubtful, however, whether this is correct; for we do not observe other parts, the functions of which require great or sudden determinations of blood,

more liable to inflammation than organs continuously engaged. But it cannot be disputed, that there are circumstances connected with the functions of the mamma which favour the occurrence of the disease, since we seldom observe it unconnected with lactation; and when it is independent of lactation, it occurs chiefly in consequence of local injury, or morbid states of the uterus.

25. The irritation, congestion, and vascular determination preceding the secretion of milk, is generally attended by fulness and slight tenderness of the breasts, and feverishness. If these local conditions are increased, or exceed moderate limits, the secretion is frequently interrupted, and the breasts become distended, tense, hot, and painful; this state readily passing into inflammation, if it be not soon removed, particularly after delivery of a first child. Dr. BURNS remarks, that some have the breasts prodigiously distended when the milk first comes, and the hardness extends even to the axilla. If, in these cases, the nipple be sunk or flat, or if the milk do not run freely, the fascia, particularly in some habits, rapidly inflames. In others, the dense cellular substance in which the acini and ducts are imbedded, or the acini themselves, become inflamed. This interruption to the flow of milk, and the consequent lacteal and vascular congestion, is one of the chief causes of inflammation. The disease may also extend, as noticed above (§ 17.), from the nipple to more deeply seated tissues. Moving the arms too freely, exposure to cold, mental emotions, and a heating diet, or the abuse of stimulants, especially when the breasts are congested and enlarged, are also frequent concurrent causes of mastitis.

26. *C. Treatment.* — The *first object* should be to procure resolution of the inflammation. This is to be attempted by the application of leeches; by venesection, if the state of the system and of vascular action permit it; by the exhibition of tartar emetic in small and frequent doses; by administering purgatives, especially those of the saline kind; by giving diaphoretics and diuretics; by low diet; by preventing the breast from hanging down, and keeping the arm of the affected side motionless in a sling; and by drawing off the milk very gently by suction at proper intervals. In order to diminish vascular determination to the breast and the secretion of milk, no means are more efficacious than purging by saline medicines, and giving antimonials so as to produce slight and continued nausea. The saline diaphoretics may also be given, with diuretics, especially the solution of the acetate of ammonia with the nitrate of potash, and the sweet spirits of nitre in camphor julap; and, if pain be urgent, opium or other anodynes may be added. As in other instances of topical inflammation, authorities are divided between refrigerating and warm and emollient applications to the part. In some cases, at a very early period, cold applications are useful adjuvants of the above treatment; but emollient poultices and tepid or warm fomentations are most frequently beneficial.

27. When suppuration cannot be prevented, the case is to be treated like any other abscess. With respect to the opening of the abscess as soon as fluctuation is detected, the rule stated by Sir A. COOPER should be followed. — "The surgeon should never wait for an abscess of the breast to approach the surface, but make an opening as soon as the slightest degree of fluctuation is perceptible." The rigid observance of this rule will generally prevent the formation of sinuses; the treatment of which does not come within the scope of this work.

28. In all the stages of this disease, some one or other of the preparations of opium should be given to allay irritation or intense pain. In the states of the malady characterised by general irritation and vital depression — by irritative or adynamic fever, as noticed above (§ 23.), opium in large doses with camphor, stimulants, aromatics, and alkaline carbonates, and the general treatment advised for *asthenic inflammation* and *diffusive abscess* (see Art. ABSCESS, § 62.; and INFLAMMATION, § 239. *et seq.*), are particularly indicated.

29. After an abscess of the breast has been opened, the diet may be improved; and if the discharge be profuse, and the pulse be deficient in power, tonics should be prescribed. If the abscess be small and superficial, the infant may suck the affected breast; but if it be large, it should be artificially drawn, and the infant confined to the other breast. However, the effect of sucking the sound breast should be closely watched, as inflammation of it also may be thereby induced, whilst the disease of the one first affected may be aggravated. In either case, the infant should be removed altogether. In cases of spreading abscess or sinuses, bark, wine, and generous diet, with pure air, or change of air, are always necessary.

30. iii. CHRONIC INFLAMMATION OF THE BREAST. — *a.* In the acute form of mastoitis, the disease seldom continues longer than five weeks; and when resolution does not take place, it generally arrives at the stage of suppuration in a few days. But a slighter state of inflammation of the organ may exist, and, from the state of the local and general symptoms, be confounded with another disease. In this case, the little pain which is felt, the absence of heat, of redness of the skin, and of febrile symptoms, and the want of rigors or chills, often prevent the suspicion of the formation of matter, which is generally indistinct and deep-seated; and suggest the existence of a malignant tumour, requiring an operation for its removal; which has even been actually performed or attempted.

31. *b.* The *Treatment* of these cases should consist of means to promote the secretions and excretions, and to improve the state of constitutional power, which is generally more or less in fault. The pilula hydrarg. chloridi comp. with soap at night, and tonic decoctions or infusions, with alkalies, &c., during the day, are usually indicated. If matter have not yet formed, Sir A. COOPER recommends the application of discutient plasters and stimulating embrocations, in order to promote the absorption of infiltrated fluid. But when matter is formed, the abscess should be opened and poulticed; tonic medicines should be exhibited, and a generous diet allowed. The glands in the axillæ sometimes become enlarged from irritation, but subside when the disease in the breast is removed.

32. iv. CHRONIC INFLAMMATION OF THE LACTIFEROUS TUBES. — *Lacteal or lactiferous swelling,* A. COOPER. — This disease sometimes follows

inflammation of the nipple, and consists of inflammation, generally chronic, of one of the lactiferous tubes near the nipple, by which its canal is narrowed, or entirely obstructed, to the extent of half an inch or more, whilst the portion which is not thus affected becomes painfully distended with milk.

33. *a.* The *symptoms* are as follows:—The tumour is confined to one part of the breast, from the nipple to the circumference; and it has not been preceded by redness, or any other symptom of inflammation of the part which is distended so as to form the tumour. The patient complains of a severe sense of distension, which is increased when the child begins to suck. There is distinct fluctuation in the tumour, while no other symptom of abscess is present: the cutaneous veins are enlarged, but the part is not discoloured. If the swelling be opened, several ounces of milk are discharged, which, being suffered to rest for a few hours, forms a cream upon its surface. If a small puncture only be made, the milk discharged, and the orifice allowed to close, the fluid re-accumulates, and the symptoms are renewed. When the distension is excessive, ulceration sometimes takes place; the milk is discharged through a small aperture near the nipple, and this discharge often continues during the whole period of lactation.

34. *b.* The *Treatment* should consist in removing the child, which will soon occasion a cessation of the secretion of milk, and then a simple puncture may be made, which will relieve the distended tube. If, however, the child be suffered to continue at the breast, the opening should be made larger, so that the milk may escape while the child is sucking, as happens when a natural relief is effected by ulceration.

III. Organic Lesions of the Mamma generally occurring independently of Inflammation.

Classif.—IV. Class. I. Order (*Author*).

35. This class of diseases of the breast seldom originates in any form of inflammatory action — or at least in an unequivocal and manifest state of inflammation; but rather in conditions of the part and of the system very different from it — especially from true or sthenic acute inflammation. This class is mostly referable to low states of vital power and vascular action, in connection with altered or morbid nutrition and secretion in the organ — to local irritation and lesion allied with constitutional vice or disorder.

36. i. Hæmorrhagic Congestion of the Mamma — *Ecchymosis of the breast*, A. Cooper. — This change is generally associated with a considerable degree of *mastodymia*. It consists *of a full and bruised appearance of the organs, accompanied with ain and exquisite sensibility or tenderness.* — *a.* It occurs chiefly in females under twenty-five years of age, and is preceded by severe pain in the breast and arm. The extravasation of blood, occasioning the ecchymosis, begins a few days before menstruation, and either is limited to a single spot, appearing as if a severe blow had been inflicted, or consists of several small spots: generally one large patch and several small and paler patches are observed. It occurs chiefly in females of delicate fibre, who have large bosoms. The part is exquisitely tender, and the pain passes down along the inner side of the arm to the ends of the fingers. This affection sometimes disappears a week after menstruation; but, in the more severe cases, it continues until the next menstrual period. It is evidently a consequence of increased determination of blood to the organ prior to the catamenial discharge, and indicates great irritability of the system, in connection with weakness of the capillaries, whereby they are incapable of resisting the determination of blood to them. It is generally attended by irregularity of the catamenia, and constitutional debility and irritability.

37. *b.* The *Treatment* should be directed to the uterine and constitutional relations of this affection. The preparations of iron, the mineral acids, sulphate of quinine, or sulphate of iron, in the compound infusion of roses, or other appropriate tonics, may be prescribed; and the liquor ammoniæ acetatis with spirits of wine, tincture of opium and rose water, may be applied locally.

38 ii. Atrophy of the Mamma. — *Absorption of the mammary gland*, or rather wasting of this part, usually occurs at an advanced age, or subsequently to the disappearance of the catamenia; and it has been said to be produced by the excessive use of the preparations of iodine. But probably, in some of the cases where this effect has been said to have been produced, the adipose substance in which the gland is imbedded is the part chiefly absorbed. Atrophy of this organ does not appear to follow the tumefaction of it sometimes consequent upon cynanche parotidea. (Cumin, *Edin. Med. and Surg. Journ.* vol. xxvii. p. 227.)

39. iii. Hypertrophy of the Mamma. — Enlargement of the organ is sometimes observed to a very great extent. In most of the slighter cases, however, particularly when both mammæ are enlarged, the hypertrophy is chiefly owing to the great increase of adipose substance around the gland. — *a.* True hypertrophy of this organ is independent of any morbid change of structure, and of any distinct tumour. It is entirely an unusual, and sometimes an almost monstrous, growth of the gland. The increase of size is generally uniform, and it is at the same time more or less pendulous. At the commencement, indications of increased determination of blood to it are sometimes evinced, as heat, uneasiness, augmented sensibility, &c. True hypertrophy of the mamma is called by Sir A. Cooper, "*the large and pendulous breast.*" It consists in an increase of the substance of the mammary gland, the lobes of which can be distinctly felt enlarged and hardened; and they are sometimes tender on pressure. This disease generally commences soon after puberty, and is believed to be always connected with defective or disordered menstruation. The breast, in many cases, has attained so enormous a magnitude as to render extirpation absolutely necessary. In a case mentioned by Mr. Hey, after the removal of the left breast, the menses, which had been entirely suppressed, returned, and the right breast diminished to less than half the size it was before the operation. The amputated breast weighed eleven pounds four ounces.

40. Sir A. Cooper describes a peculiar form of hypertrophy of the mamma incident to unmarried women of the age of thirty or thirty-five, in whom the menses are defective in quantity, and who are the subjects of severe leucorrhœa. The breasts become enlarged, but not pendulous. On careful examination the lobes of the gland can be distinctly

felt enlarged and hardened, and moving freely on one another. Both breasts are affected, but one usually more than the other, and there is occasional pain, especially just before the appearance of the menses, which are scanty, pale, and of short duration. Exposure of the part to cold augments the pain, and, in these cases, cold has a great influence in lessening the menstrual secretion. An enlarged absorbent gland is sometimes found in each axilla; but this arises from simple irritation. After a while the breasts begin to waste, and in a few years are nearly absorbed.

41. *b.* The *Treatment* of this affection is that of amenorrhœa, of which it is generally a consequence. In the first variety of it, local means are not likely to be of any service. In the second variety Sir A. COOPER recommends the application of the emplastrum ammoniaci cum hydrargyro, and of leeches when there is pain. In both varieties, the preparations of iodine are the most appropriate remedies, and when judiciously prescribed, and combined with deobstruents and emmenagogues, are often of service. The iodide of potassium alone, or with liquor potassæ and conium; the iodide of iron, and the iodides of mercury, should be preferred, as they exert an emmenagogue operation, whilst they diminish the size of the mamma.

42. iv. SCROFULOUS TUMOURS OF THE BREAST. —*a.* In women of a strumous diathesis the mamma is subject to various indolent tumours, which in their earlier stages are not easily distinguished from diseases of a much more serious nature. Sometimes a hard lump forms in the organ and remains almost quiescent for months or even years; or the whole gland may be affected with scrofulous enlargement. The general tendency of the disease, however, is to the slow and imperfect suppuration characteristic of strumous action; and the matter has the curdy appearance which the contents of scrofulous abscesses always present. Ulcerations of great depth and extent sometimes result; but the topical disease usually produces no proportionate effects on the constitution. In this disease, the part is always enlarged, not contracted as in one form of carcinoma. The tumour is tender when grasped, but it does not present the stony hardness observed in the latter malady. According to Dr. CUMIN it is never attended by retraction of the nipple. The indications of the strumous diathesis of the patient, together with the characteristics of scrofulous ulceration in the part, will further determine the nature of the disease.

43. *b.* The *Treatment* of scrofulous tumours of the breast is the same as that just recommended (§ 41.), namely, the exhibition of the preparations of iodine; of BRANDISH's alkaline solution, conium, &c.; or the means advised in the article SCROFULA. Strict attention should be directed to the uterine functions; the catamenia ought to be promoted, and the general health improved.

44. v. ADIPOSE TUMOURS are but rarely found in the breasts; but they reach a very considerable magnitude. In the cases described by Sir A. COOPER, the tumours formed, in one case, between the gland and the surface of the pectoral muscle; and in another, between the different portions of the mammary gland.

45. In the *treatment* of these tumours, the internal use of the iodide of potassium, with or without the liquor potassæ, should not be overlooked, as I have found these remedies succeed in removing adipose tumours in other situations.

46. vi. CHRONIC MAMMARY TUMOUR.—*a.* This disease generally attacks females between the ages of seventeen and thirty-five. It is often independent of very manifest constitutional disorder, and it does not necessarily affect the general health, unless by occasioning anxiety in the mind of the patient as to its nature. But it is usually connected with uterine irritation or disorder. It occurs chiefly in single women, or in those who have not had children. The tumour grows from the periphery of the breast rather than from its interior; and it therefore generally appears to be superficial: occasionally, however, it springs from the posterior surface, and it is then deep-seated, and not so readily discriminated. It is extremely moveable, and glides easily over the surface of the breast, to which it is attached chiefly by an aponeurosis. It begins and often continues for many years without exciting pain; in some cases, however, it is attended with an aching pain, which extends to the shoulder. It is not generally tender to the touch, but Sir A. COOPER has occasionally found it so just before the menstrual periods. Its growth is very slow, and it seldom attains any great magnitude, usually weighing from one to four ounces. One, however, which was removed by Mr. BOND, of Brighton, weighed a pound and a half, and Sir A. COOPER mentions a case which occurred in Guy s Hospital, and which he believes to have been of this nature, where the tumour weighed several pounds, and had ulcerated at its most prominent part. These tumours are originally quite free from malignancy; they exist for many years almost in a stationary condition, and then gradually diminish and disappear.

47. *b.* The most distinctive *anatomical feature* of this tumour is its lobulated structure, which may be felt by careful manipulation before its removal. *On dissection* the tumour is found to be contained in a bag formed of a fibrous structure, similar to that which envelopes and enters the interstices of the mammary gland: and this envelope becomes denser in proportion to the magnitude of the tumour. When first laid bare, the tumour appears to be composed of large lobes, like those of the breast; but, when more completely unravelled, it is found to consist of smaller and smaller lobes, similar in form and easily separable by maceration in water. Sir A. COOPER observes, "The impression made upon the mind during the dissection of the tumour is, that Nature has formed an additional portion of breast composed of similar lobes, but perhaps differing in the absence of lactiferous tubes. When first opened, they appear red in the circumference, but whiter in the interior."

48. *c.* The *diagnostic marks* of this disease are, the youth of the patient, scirrhus rarely appearing before thirty, this disease seldom after it;—absence of pain, or of pain similar to that of cancer, the pain sometimes felt being slight, and considerable swelling existing for years without it;—the general health being either not at all or slightly affected*;—the slow progress of the swelling,

---

* When the patient perceives the physician to be suspicious of its malignant nature, her anxiety may so disorder the general health as to increase the difficulty of the diagnosis. Such was the case in respect of a lady sent to me a few years ago from the country by her

and its stationary condition for many months or even years; — its extreme mobility, its superficial position, or its situation upon or in connection with the gland rather than in it; — and lastly, its lobulated feel, it being distinctly composed of numerous lobes conglomerated into one mass, with a divided surface. The glands of the axilla very rarely enlarge, the enlargement being the result of irritation only.

49. I believe that Sir Astley Cooper is correct in his observation, that, although these tumours are not in their commencement malignant, and they continue for many years free from the disposition to become so, yet if they remain until the period of the cessation of menstruation, they may assume a new or malignant action. I believe, moreover, that protracted anxiety and the depressing emotions generally, may produce the same effect, even before this period occurs.

50. *d.* The *cause* of this disease is chiefly vascular determination consequent upon irritation seated principally in the uterine organs and extending to the mamma. Hence it is often associated with signs of uterine excitement or irritation, or with disorder of the catamenia. It is sometimes ascribed to a blow, or to the pressure of stays; but these are rather concurring or additional, than the only causes.

51. *e.* The *Treatment* should be directed chiefly to the state of the uterine organs; for the disease is seldom much influenced by means directly applied to it. The disappearance of the tumour is generally owing to the cessation of the uterine irritation in which it originated, or to the mamma being called upon to exercise its natural function in the secretion of milk. The catamenial discharge ought to receive attention, as regards its time, its quantity, its colour, and its duration. When it is scanty, difficult, attended by pain, pale, or delayed, I have found an occasional purgative of calomel and compound extract of colocynth, and the preparations of iron or of iodine, more particularly the iodide of iron, the iodides of mercury with conium, or the iodide of potassium with liquor potassæ and tonic infusions, extremely beneficial. The mist. ferri composita with conium, and attention to the biliary and digestive functions, are also very serviceable. Where these functions are torpid, the pilula hydrarg. chloridi composita with soap and conium at bed-time; and the infusum calumbæ, vel infus. cascarillæ, cum infuso rhæi et sodæ sub-carbon, &c., twice a day, will generally be of service. The emplastum ammoniaci cum hydrargyro, and a weak iodine ointment, are the best *local applications*; but these should not supersede the internal use of some one of the preparations of iodine, in small doses, and for a sufficiently long period. Pregnancy and lactation are, however, the most certain means of removing this disease. A young lady resident in a country town had this disease, and two or three surgeons were consulted respecting it. She was engaged to be married, and her intended husband was made acquainted with her complaint. Owing to the opinion then given the marriage was delayed for more than two years, during which time the disorder was stationary. Another surgeon was consulted, who recognised the true nature of the disease, and sent her to London for my opinion. I advised her no longer to delay her marriage. Sir A. Cooper was afterwards consulted, and concurred in this opinion. The disease afterwards gradually disappeared.

52. vii. Painful Tumour of the Mamma — *Irritable tumour of the breast*, A. Cooper.—a. The female breast, as already stated, is liable to severe hysterical or neuralgic pain, quite unattended by swelling or distinct tumour. But similar pains to those above noticed (§ 11.) are sometimes associated with slight tumefaction of one or more of the lobes of the organ; and more rarely they are attendant upon a specific tumour, described by Sir A. Cooper. In the neuralgic affection, without any circumscribed tumour, the swelling appears to be merely an incidental complication, as in neuralgia of the face and other parts. The pain, though greatest at some particular part, generally pervades the whole breast, and extends to the shoulder, axilla, arm, and fingers of the affected side, sometimes also extending downwards even to the hip. The slightest pressure on the breast occasions intolerable pain, and alternate sensations of heat and cold are felt in the affected part. The intensity of the pain often occasions sickness and vomiting. The symptoms are much augmented just before menstruation, somewhat relieved during its continuance, and diminished after its cessation.

53. Besides this irritable state of the whole or part of the breast, a distinctly circumscribed tumour is sometimes found, often not larger than a pea, and seldom exceeding the size of a marble. It is highly sensitive to the touch; very moveable; and acutely painful at intervals, especially prior to menstruation. Occasionally several such tumours co-exist, but there is usually only one. These tumours continue for years. Sir A. Cooper has never known them to suppurate. They sometimes spontaneously cease to be painful, or disappear altogether.

54. b. *On Dissection,* they are found to consist of a solid, semi-transparent substance, with fibres irregularly interwoven. They seem to be productions of the cellular membrane rather than of the glandular substance of the part; and similar tumours are met with in the cellular membrane of other parts of the body which are attended with the like painful sensations. Sir A. Cooper has not been able to trace any large filament of a nerve into them.

55. These painful or neuralgic tumours of the breast are met with generally between the ages of sixteen and thirty; and, from this as well as from other circumstances, cannot be confounded with other diseases. They affect principally females of a nervous temperament; are commonly connected with deficient, difficult, or suppressed menstruation. In some cases, however, Sir A. Cooper has observed them associated with morbidly abundant menstruation. In a case of this affection, for which I was lately consulted, and which has been removed by treatment directed chiefly to the uterine organs, a severe return of it occurred during the second month after marriage, evidently in connection with early pregnancy. I have observed these affections complicated with leucorrhœa as well as with catamenial disorder.

---

medical attendants for my opinion. I readily recognised the non-malignant nature of the malady, and in this opinion both Sir A. Cooper and Sir B. Brodie, who subsequently met me in consultation on it, entirely concurred.

56. *c.* The *Treatment* of this affection should be directed, 1st. to the alleviation of the local suffering; 2d. to the subduing the general irritability; and 3d. to the restoration of the uterine organs to a healthy condition.

57. *a.* Sir A. Cooper states that the best *local remedies* are, a plaster consisting of equal parts of soap cerate and extract of belladonna; poultices of bread with solution of belladonna; and oil-silk, or hare-skin or some other fur worn upon the breast. Leeches may be used when the pain is very severe; but, if prescribed for weak or reduced constitutions, or when the disease is connected with anæmia, or too frequently resorted to, they aggravate the irritability of the system.

58. *b.* To remove the general irritability, the treatment advised for Neuralgic Affections are the most efficacious, with proper attention to the uterine functions. If the biliary organs be sluggish, the chloride of mercury, or Plummer's or blue pill, with soap, opium, and conium, should be given at night; and a stomachic or an emmenagogue aperient in the morning; the preparations of iron, or of bark with soda or potash, or camphor being taken during the day. Sir A. Cooper advises the following pill to be taken twice or three times in the day.

No. 290. ℞ Extracti Conii; Ext. Papaveris, āā, gr. ij; Extr. Stramonii è Seminibus, gr. ¼ vel ss. M. Fiat Pilula, bis terve in die sumenda.

59. *c.* In order to remove the uterine disorder, the carbonate of iron, the ammoniated iron, the compound myrrh mixture, the compound aloes mixture, and similar means, combined with such others as the peculiarities of the uterine disorder will suggest, ought to be prescribed. These means may be promoted by a recourse to a hip-bath of sea water or of artificial salt water, of a temperature of about 100°, or 103°. A salt-water shower-bath, or the salt-water douche, on the loins and hips, will also be of service when aided by regular exercise in a dry, temperate, and pure air; by attention to diet, regimen; and by due regulation of the mental emotions and desires.

60. viii. Cartilaginous and Ossific Tumour. — According to Sir A. Cooper, these tumours are consequences of chronic and specific inflammation of the breast, during which a gelatine is effused resembling that in which bone is formed in the fœtus. But the formation of bone in the fœtus is not an inflammatory process. He supposes that bloodvessels and absorbents enter the effused gelatine from the adjoining parts; and as the latter remove portions of it, the former deposit the ossific matter in the interstices. Bayle describes ossification as the last stage of what he denominates fibrous tumour of the breast. Sir A. Cooper removed a tumour of the kind under consideration from a woman thirty-two years of age. It was of fourteen years' standing, excessively hard, and very painful. The pain was increased before menstruation, and greatly relieved after it. The skin covering it felt very warm in comparison with the surrounding parts, and required the constant application of evaporating lotions. On dissection, the greater part of it presented the appearance of the cartilage which supplies the place of bone in the young subject; the rest was osseous. The most remarkable case on record is that of a nun, in whom the mammæ were found after death transformed into hemispheres of bone. (*Miscel. Nat. Curios. Dec.* ii. An. vi.)

61. ix. Cystic and Hydatidic Tumours of the Mamma. — Tumours of this description have been described by Sir A. Cooper, M. Velpeau, Dr. Warren, and Dr. Cumin. The first of these writers has described *four* varieties of hydatid diseases of the organ, three of which he considers not to be malignant; the fourth to be malignant. A more correct division would be into those consisting — 1st, of serous cysts; and, 2d, true hydatids; and it is not improbable that the former may assume various forms, or be variously transformed, as respects the characters and number of the cysts, the appearances of their coats, and the nature of their contents, in the progress of their growth, and by peculiarities and changes in the patient's constitution and health. Indeed, any one of them may possibly assume the cancerous or malignant character, owing to these circumstances.

62. *A.* The *cystic tumours* vary remarkably, not only as respects the number and size of the cysts forming the tumour, but as respects the number and appearances of their tunics, and the nature of their contents. Some of these tumours present one large cyst, with various partitions; others consist of several cysts, more or less distinct; others, again, are formed of several concentric tunics: some contain a sero-mucous fluid; others a sero-sanguineous liquid.

63. Sir A. Cooper describes, as follows, his first species, or tumours consisting of *simple serous cysts*, or bags; he, however, confounds *simple cysts* with hydatids (see art. Hydatids). — In this form of disease, the breast gradually swells; and is, at first, free from pain and tenderness. It becomes hard, without fluctuation; and grows slowly for months, or even years, sometimes acquiring a very considerable size. At an early stage the swelling feels entirely solid, and greatly resembles a simple chronic enlargement of the breast; but, after a great length of time, fluctuation may be detected at one part of it. The tumour then begins to increase more rapidly, and fluctuation may soon be detected in several parts. There is still, in most cases, little or no pain; some patients, however, feel an unusual heat in the part, and others experience pain in the breast and shoulder. The tumour is extremely moveable on the pectoral muscle, and is very pendulous. In some cases, the whole of the mammary gland becomes involved; in others, only a small portion of it. Such tumours often attain a very considerable size: Sir A. Cooper states that the largest he ever saw weighed nine pounds; but that, in other cases, although the diseased breast was entirely filled with cysts, it never exceeded twice the size of the healthy one. At length, one of the fluctuating portions slowly inflames, ulcerates, and discharges a large quantity of a fluid resembling serum, but somewhat more glairy. If the sac be entirely emptied, and the external opening closed, it is a long time before the fluid reaccumulates, and, occasionally, the sac is obliterated by the adhesion of its sides. Sometimes several cysts burst in succession, at distant periods, forming sinuses which are very difficult to heal. Except during the process of ulceration, the general health is not at all disturbed. Even when the tumour is large, ulcerated, and dis-

charging profusely, the axillary glands remain unaffected; or, if one be slightly enlarged, it is from simple irritation, and the enlargement subsides when the disease in the breast is removed.

64. The *second species* of cystic tumour described by Sir A. Cooper seems hardly entitled to rank as such, since it is formed on a single case, and a doubt is expressed whether even this might not have been of the nature of the globular or true hydatid. It is represented as undistinguishable from the preceding species except by dissection. In the case examined by Sir A. Cooper the tumour consisted of vast numbers of cystic formations, the largest of which did not exceed the size of a barleycorn. They were oval, and composed of numerous lamella, which could be peeled from each other, and which were very vascular.

65. *B.* The *true globular hydatidic tumour*, the third species of hydatid tumour of Sir A. Cooper, is similar to hydatid productions in other parts of the body. Sir A. has found the globular hydatid only to exist singly in the breast, although great numbers are found congregated in other parts. When one of these hydatids is developed in the breast, inflammation is excited, and a wall of fibrine surrounds it. The tumour feels hard, and while it is small no fluctuation is perceptible; but as it increases, and the fluid becomes more abundant, a fluctuation may be felt in the centre of the tumour. Sometimes, when the hydatid has attained a considerable size, it occasions suppuration; and the cyst being discharged along with the matter, a spontaneous cure is effected.

66. *C. Diagnosis.* — Cystic and hydatidic tumours of the breast, in their first stage, may be confounded with chronic inflammation, but are distinguishable from it by the absence of tenderness on pressure, and still more decidedly by the unimpaired health of the patient. In the second stage, when fluctuation is perceptible, they may be distinguished from abscess by observing that the fluctuation exists at more points than one; and the puncture of a cyst will at once remove all ambiguity. These tumours of the breast are distinguished from scirrhus by the absence of lancinating pain and stony hardness which characterise the latter, by their mobility on the pectoral muscle, by their pendulous state, and by the unimpaired general health of the patient. Sir A. Cooper, however, has seen a case in which true scirrhus was combined with hydatids; and Mr. S. Cooper has met with a similar instance. The former of these writers has never seen those tumours seated in both breasts at the same time. They are met with at all ages after puberty; but seem more frequent under than above the age of thirty or thirty-five. Of the cases adduced by Sir A. Cooper, sixty years was the greatest age.

67. Although neither *serous cysts*, nor true globular *hydatids* of the breast, are of themselves dangerous, yet I agree with Dr. Cumin in suspecting that they occasionally give rise to, or rather are transformed into, other morbid changes of a very serious nature. The contents of the cysts are at first a straw-coloured serum; but in time this may acquire a greenish colour, and even a fœtid odour. Indeed, I believe, that not only these tumours, but also the other chronic tumours noticed above, the cystic and hydatidic more especially, may assume, particularly in persons above thirty years of age, a scirrhous or malignant character; when anxiety of mind, the depressing emotions, and other causes of physical depression and exhaustion, have permanently lowered the vital energies, and weakened vital resistance to the local mischief.

68. The *Morbid Anatomy* of cystic and hydatidic tumours is so similar in all parts of the body, that we need not here dwell on their particular characteristics as occurring in the breast. The reader will find them minutely detailed, as respects this organ, in Sir A. Cooper's work, and in the article by M. Velpeau, referred to in the Bibliography.

69. *D.* Neither local applications nor internal medicines are of any service in this disease, the *treatment* of which is purely surgical. If there be only one large cyst, the fluid may be evacuated by a simple puncture, and in some cases, it will not again accumulate; but where the enlargement of the breast is excessive, and the cysts numerous, and especially where the patient is under great apprehension of some malignant disease, the tumour should be removed, taking care to extirpate every part of the morbid formation, since, if a single cyst be allowed to remain, the disease will be renewed.

70. *E.* The *third* or *malignant class* of diseases of the breast comprise chiefly *cancer* and *fungus hæmatodes*, or encephaloid disease. But, after what I have stated in other parts of the work, it is unnecessary to advance any thing at this place respecting these maladies when affecting the mamma. The reader will find all that is requisite to be considered respecting them in the articles Cancer and Fungoid Disease.

Bibliog. and Refer. — *Justamond*, Tracts, &c. 4to. — *W. Rowley*, Pract. Treatise on the Diseases of the Breasts of Women. 8vo. Lond. 1772. — *Clubbe*, Treatise on the Inflammat. of the Breast, 8vo. Lond. 1779. — *Schlegel*, De Statu sano et morboso Mammarum in Gravidis et Puerperis, 4to. Jenæ, 1791. — *A. G. Richter*, Medicinische u. Chirurg. Bemerkungen, t. i. ch. i. — *I. Noth*, Observ. on the Treatment of Scirrhus, Tumours, and Cancers of the Breast, 4to. Lond. 1804. — *Vogt.* De Mammarum Structura et Morbis. Wittem. 1805. — *J. Burns*, Principles of Midwifery, &c. 8vo. p. 623. — *Desruelles*, Observat. et Reflex. sur les Kystes des Mammelles, in Journ. Univers. des Sc. Méd. t. xxvii. p. 356. 1822. — *V. abHildenbrand*, Institutiones Practico-Medicæ. t. ii. p. 271. — *Dewees*, Treat. on Diseases of Females, 8vo. p. 427. — *Benedict*, Bemerkungen über die Krankh. der Brüste und Achseldrüsen, 4to. Breslau, 1825. — *Graëfe*, Archives Génér. de Méd. t. xvi. p. 593. — *H. Earle*, in Lond. Medical Gazette, vol. x. p. 153. — *Cumin*, in Edin. Med. and Surg. Journ. vol. xxvii. p. 1. — *A. Cooper*, Illustrations of Diseases of the Breast, 4to. Lond. 1829. — *Nevermann*, De Mammarum Morbis Curandis, &c. 8vo. Rostock, 1831. — *Beatty*, Dublin Journ. of Med. Sciences, vol. iv. p. 340. — *Velpeau*, in Dict. de Médécine, 2d edit. art. *Mammelles*. — *A. Dugés*, Dict. de Méd. et de Chirurg. Prat. art. *Mastotte* — *F. Churchil*,. Observat. on the Dis. incident to Pregnancy and Childbed, 8vo. p. 447. Dublin, 1840.

MANIA. — See Insanity.

MEASLES. — Synon. — *Morbilli* (a lesser plague in the Italian), Morton, Sydenham, Juncker. *Febris Morbillosa*, Hoffmann. *Rubeola*, Sauvages, Cullen, Willan, &c. *Roseola*, Auct. var. *Phœnicismus*, Ploucquet. *Synocha Morbillosa*, Chrichton. *Cauma Rubeola*, Young. *Exanthesis Rubeola*, Good. *Masern*, *Rötheln*, *Flecken*, *Kindsflecken*, Germ. *Rougeole*, Fr. *Rosolia*, *Rossole*, *Morbilli*, Ital.

Classif. — I. Class. III. Order (*Cullen*). III. Class, III. Order (*Good.*). — III. Class, III. Order (*Author*, in *Preface*).

1. Defin.—*After catarrhal symptoms, the eruption, generally on the fourth day, of a crimson rash, consisting of stigmatised dots, slightly elevated, and disposed in irregular circles or crescents, usually desquamating on the seventh day, and accompanied with inflammatory fever,—the disease being an infectious exanthematic fever, frequently occurring epidemically, and affecting the system only once.*

2. This disease attacks chiefly children, but no age is exempt from it, and it appears in all climates. It generally commences from seven to fourteen days after the reception of the contagion, with horripilations followed by catarrhal fever, on the third, fourth, fifth, or even sixth day of which, but usually on the *fourth*, a crimson rash appears, and after a continuance of four days, gradually declines with the fever. It may attack the fœtus in utero, when the mother is affected by it. It is usually most severe in young children, especially during teething and soon after weaning, at the time of the second dentition, and at the approaching period of puberty. It is comparatively slight in adults; but to this there are many exceptions, the severity of the disease, even in them, depending much upon the prevailing epidemic, and upon the climate in which the epidemic occurs.

3. I. History.—Several writers, and amongst others Sennert, Welsch, Manard, Odier, and Bateman, suppose that measles were known to the ancients. Odier has even contended that the plague of Athens described by Thucydides was an epidemic visitation of this disease. Gruner (*Antiquit. Morbor.* p. 54.) and Sprengel, however, as well as many other judicious authors, have shown that the earliest accounts we have of this disease, refer it to about the period at which small-pox was conveyed from Arabia to Egypt, and thence into Europe.

4. The earliest account which has been furnished of measles, is contained in the Pandects of *Rhazes*, who describes it under the name of *Hhasbah*, not, however, from his own observations only, but also from the information conveyed by Ahron, who lived in 622 at Alexandria. Ueberlacher (*Ueber die Grundlosigheit der ersten Schilderung*, &c. Wien, 1805), entertains, however, an opposite opinion, as to the description of Rhazes being applicable to measles, but, in my opinion, without sufficient grounds. Avicenna and Mesue have also described measles (*Hhasbah*), and distinguished it from small-pox (*Dschadari*), and the morbillous form of scarlatina (*Hhamikah*).

5. It has been supposed by Schnurrer (*Chronik der Seuchen*, s. 117.), that the epidemic which prevailed A. D. 455 through Phrygia, Cappadocia, and Cilicia, and is described by Eusebius as being accompanied with inflammation of the whole skin, turgidity of the eyes, and violent cough, was measles in a severe form; but the imperfect description given of that epidemic leaves room only for supposition.

6. The invasion of Spain by the Saracens in the eighth century most likely extended this disease to Europe at the same time with small-pox. Mention is made in the chronicles of the time that an epidemic prevailed in Italy in 876, which was characterised by pain and turgidity of the eyes, severe cough, &c., and which, as Schnurrer supposes, may possibly have been this disease. About the middle of the twelfth century Synesius (*De Febribus*, edit. Barnardi, Anat. 1749) translated into Greek the work of an Arabian physician, Abn Dschafar, where small-pox (*φλυκταινούση λοιμικὴ*) is distinguished from measles (*ἑτέρα λεπτῆ καὶ ποκνῆ λουμικὴ*).

7. However, measles was very generally confounded with small-pox even as late as 1674. Amongst the last writers who committed this error were Lange and Diemerbroeck, whilst the distinction was first clearly made by Forestus (1597), Schenck (1600), Riverius (1655), and particularly by Sydenham (1676), and F. Hoffmann (1718), who, with Huxham and Lepecque de la Cloture, have recorded the history of several epidemics, and added greatly to our knowledge of the disease. At the same time it may be noticed that Morton and Watson confounded *measles* with *scarlet fever*, and viewed the latter as a severer variety of the former disease; and, as Dr. G. Burrows has remarked, it was not until the appearance of Dr. Withering's *Essay on Scarlet Fever*, in 1793, and of Dr. Willan's *Treatise on Cutaneous Diseases*, that the profession was fully convinced of the distinct nature of the two diseases.

8. II. Description of Measles.—Instead of dividing this disease into different *varieties* or *forms*—as the *Rubeola vulgaris*, the *Rubeola maligna*, and the *Rubeola sine catarrho*, &c., I shall *first* describe *the regular form of the disease*, and *next* notice *those modifications, complications, and irregularities* which it presents, according to the influence of individual constitution, epidemic prevalence, and of climate.

9. i. The Regular Form of Measles.—*Rubeola vulgaris*, Willan, Bateman, &c.; *Morbilli regularis*, Sydenham; *Rougeole vulgaire*, Fr. The *progress of the disease, in its regular and common form*, is similar to that of all the eruptive fevers, and consists of *four* well-marked *stages*, namely—1st. The period of *febrile commotion*;—2. That of *eruption*;—3d. The stage of *florescence*;—and, 4th. That of *desquamation.*

10. 1st. The *period of febrile commotion*, or of *precursory fever*, is that in which the infection of the whole frame has commenced, and that febrile action appears, which produces, after a certain period, the cutaneous eruption. This stage usually commences with chills, horripilations, shudderings, or rigors, alternating with heat of skin, and accompanied by a turgidity, erethism, or catarrhal irritation of the mucous membranes, particularly those of the respiratory apparatus. The patient is affected with frequent sneezing, coryza, stuffing of the nose, sometimes with dryness and redness of the pituitary membrane,—with heat, redness, turgidity, and watering of the eyes; sensibility to light, heaviness or pain in the head, somnolency in very young children, and in older subjects, wakefulness; frightful dreams; pain or aching in the back and loins; soreness, pain, and tenderness at the epigastrium, and with slight hoarseness and dry cough. Sometimes the eyelids and sub-maxillary glands are slightly swollen. The appetite is diminished or abolished, whilst the desire for cold drinks is much increased. The tongue is white and loaded, and an unpleasant taste in the mouth is often complained of. There are frequently nausea, vomiting, and a lax or irregular state of the bowels. The febrile commotion rarely amounts to the production of con-

vulsions or delirium: but generally, more or less exasperation of fever, preceded by chills and horripilations, and accompanied with a full hard pulse, oppression at the chest, and difficulty of breathing, occurs towards evening, and remits towards morning, when a slight moisture appears in the skin, until the eruption appears. Instances, however, are not uncommon of so slight a grade of the disease, as not to render it necessary for the patient to keep his bed: and yet in some of those cases the patient may have complained for several days of catarrhal fever. In the more severe cases, hæmorrhage sometimes takes place from the nostrils, or a hæmorrhagic discharge occurs from the uterus, in this stage with considerable relief.

11. 2d. *Stage of eruption*. During the third febrile exacerbation, generally about the fourth day from the first occurrence of horripilations, an eruption takes place first on the face, particularly the cheeks, around the eyelids, nose, and ears; and next on the neck, breast, arms, hands, and abdomen, and last on the lower extremities, with more or less turgidity of the countenance, particularly of the eyelids. Sometimes great restlessness, anxiety, convulsive movements, inequality of pulse, pain and sense of fulness in the head, slight delirium, or epistaxis usher in the eruption, which is generally completed in twenty-four hours. At this period, the tongue is red at its point and edges, loaded or furred at its base, and the fauces exhibit some obscure patches resembling the cutaneous eruption. The eruption is at first discrete and scanty, resembling the bites of fleas. The stigmata increase, are of a crimson or reddish colour, slightly elevated above the skin, and rough to the touch, particularly on the face and early in the eruption. When examined with a glass, they have a rounded or rather an elliptic form, resembling linseed. When the papulæ are fully formed they are of a lively red, but contain no fluid; when pressed by the finger they momentarily lose their colour, which returns rapidly upon removing the pressure; and their circumference is not defined, their colour being deepest in the centre and becoming paler until they insensibly pass into the natural tint of the skin. WEDEKIND (*Ueber die Masern*. RÖSCHLAUB's *Magazin*, iv. B. No. 6.) observed an extremely fine hair, scarcely discernible by the unassisted eye, penetrating each of the morbillous papulæ. If the eruption is very scanty, it is never equally diffused over the surface, but appears in clusters in different parts, separated from each other by large patches of healthy skin. Although the papulæ or stigmata may approximate nearly to each other, and coalesce into patches, they never completely run into each other, particularly in the early period of the eruption. In the more severe cases, however, especially in adult subjects, they often coalesce much more closely, the cutaneous surface assuming a deep red. The more acute the fever, the more copious is the eruption, which scarcely ever diminishes the fever, but, on the contrary, is often increased by it, until the period of desquamation. During the eruptive stage the transpiration and breath have a peculiar odour, which generally continues till the seventh day, and is at first of a slightly sweetish, and afterwards of an acidulous character, and has been likened by HEIM to that given out by a recently killed goose.

12. 3d. The *period of florescence*. The eruption continues generally in full force for nearly three days, namely, from the fifth, when it is usually fully out, till the seventh, when it subsides; but this stage presents no distinct marks from the foregoing, for the eruption on the face and neck generally declines on the sixth, whilst it is fully out on the body and limbs, or even only breaking out on the lower extremities. The stigmata coalesce more closely, the skin becomes more uniformly red, tense, or turgid, extremely hot and itching; and the tumefaction of the face and eyelids, particularly on the fourth and fifth day, is very marked. The tongue and fauces now evince an evident participation in the eruption. The fever and catarrhal symptoms show scarcely any remission, but are even sometimes encreased. Intolerance of light, dryness of the nostrils, hoarseness and dyspnœa, and a hoarse clangous or barking cough, at first dry, and afterwards frequently followed by the expectoration of a thin mucus, containing dense, rounded, albuminous particles, continue during this period. Towards evening, the fever, restlessness, and heat of skin increase. Sometimes a slight diarrhœa occurs, from which the patient experiences some relief. The urine is generally of a deep colour, and scanty.

13. 4th. *Period of desquamation*. On the seventh and eighth days from the commencement of the first stage, the eruption declines on all the upper part of the body; but the subsidence and desquamation of it have generally begun a day or too earlier on the face and neck, the turgidity of which is now much diminished. On the eighth and ninth days, and in the same order as the eruption appeared, it subsides, with desquamation of the cuticle; and on the tenth and eleventh days it has entirely disappeared, leaving in its place a furfuraceous desquamation, passing off generally with an encreased and troublesome itching, and a slight moisture on the surface. The more prominent and copious the eruption, the more marked the desquamation becomes. Generally, when the eruption is very slight, the skin continues unchanged. In the course of this stage, critical perspiration, a copious sediment in the urine, and free evacuation, frequently supervene and contribute to its felicitous termination. But the pectoral symptoms usually continue longer, and occasionally with encreased severity, particularly the cough, hoarseness, and the expectoration already described. With the subsidence of these, the system returns to the healthy state.

14. ii. MODIFICATIONS, COMPLICATIONS, AND IRREGULARITIES OF MEASLES. — There are various circumstances which contribute *to modify the progress and character of measles*. Of these, the most important are the prevailing nature of the epidemic, the season of the year, the state of the atmosphere in respect of temperature and moisture, the nature of the locality, the ventilation of the place and apartments, the previous health of the patient, and his temperament and habit of body. But I believe that there are few causes proper to the individual that has greater influence on the character of the disease than the vital powers of the system, and the disposition which the patient may possess to affections of some vital or important organ.

15. *A. Measles with predominance of Inflammatory Character*. — *a*. This form of the disease is

generally ushered in with marked febrile symptoms of the inflammatory type; full, strong, or oppressed and frequent pulse; great heat of skin; a phlogistic appearance of the blood drawn from a vein; severe catarrhal symptoms, with acute coryza; marked injection and turgidity of the conjunctiva; watery discharge from the eyes; constant cough, with oppression at the chest, great difficulty of respiration, bloody sputa, and other symptoms of inflammation of the mucous membrane of the air passages and lungs, and occasionally with acute pain and other signs of pneumonia or pleuro-pneumonia. The eruption appears rapidly and copiously, with convulsions in young children, and delirium in older patients; or at least, with most severe pains in the head; after which, a slight amelioration is sometimes observed. The eruption is more intensely red, more prominent, and more closely coalescent, so as to occasion a nearly erysipelatous redness and tumefaction of the face and other parts, than in the common form of the disease. Desquamation also often takes place earlier, and is not infrequently complicated with, or followed by, marked inflammation of the lungs and bronchial membrane; or even by various modifications of croup.

16. This state of the disease is most frequent during the epidemics which occur in winter and spring; in persons of a robust, sanguine, and irritable temperament, and plethoric habit. It occurs *sporadically* in those who are exposed soon after infection to cold in any form, particularly to a cold dry air after the body has been heated; and in children who are teething, and who have been highly or grossly fed, and kept in warm apartments, and are of an inflammatory and plethoric habit.

17. *b.* This form of measles is so very frequently *complicated* with serious *inflammation of the air-passages and lungs*, and is so liable to kindle up those diseases, towards its decline, or to dispose to them during convalescence, that strict attention should be directed to the circumstance.

18. *α.* When extensive or severe *bronchitis* occurs during the course of this type of measles, the patient is often suddenly attacked with great difficulty of breathing; the face is pale, if it precede the eruption, but generally somewhat livid, or of a deep crimson, if it occur during the eruption. Sometimes the eruption either appears only partially, or recedes prematurely; the lips are also livid; the chest and diaphragm, as evinced by the motions of the abdomen, labour much during respiration, and a sonorous, sibillous, and, lastly, a mucous rhonchus, is heard on auscultation. The countenance becomes anxious; the expectoration is more or less abundant, and attended with severe paroxysms of cough; the pulse is quick, small, or oppressed; and the skin either cool or warm in parts only. This state of disease is not merely a severe form of bronchitis, but an association of it with congestion of the lungs, to which a similar state of the brain is sometimes superadded. The pulmonary affection, in this severe form, may soon terminate the life of the patient, chiefly in consequence of the effusion which takes place in the air passages, together with the loaded state of the vessels of the encephalon.

19. In the less severe forms of the complication of bronchitis with measles, or when the bronchitis is not conjoined with congestion of the organ, the symptoms are less marked; there is less urgent oppression at the chest, and the lividity of the countenance is generally absent. But these less severe states of bronchitis not infrequently superinduce inflammation of the substance of part of the lungs or of a whole lobe. In this case the sputum becomes more purulent, more rounded, and sometimes streaked with blood; respiration is puerile in the vicinity of the affected part, in which the respiratory murmur is either feebly heard, or is attended by crepitating rattle, or the sound is no longer detected in it, whilst the chest is dull, in this situation, upon percussion. At the same time the respiratory motions are quick, laboured, unequal, and imperfect.

20. *β. Pleuritis* may occur during the course of this type of measles; and the inflammatory action may either originate in, or may extend to, the pleura from the affected part of the lungs. But in either case we seldom find in measles that the pleura becomes inflamed without a portion of the lungs participating in the diseased action. The presence of acute pain generally indicates this complication, with immobility of the ribs, quick inspiration, and slower expiration, and pain on percussion, which gives no further information, unless effusion has taken place, when a dull sound will be emitted, and the œgophonous sound heard on auscultation. This form of complication not infrequently terminates in hydrothorax, particularly after the disappearance of the eruption.

21. *γ.* Another severe and dangerous *complication*, viz. *croup*, sometimes occurs in this form of measles. It generally appears during the stages of eruption and florescence, and more rarely subsequently. It is chiefly characterised by hoarseness and ringing croupy cough, followed by difficult and sibillous inspiration; by soreness and tumefaction about the larynx and trachea; and by the expectoration, after the paroxysms of strangulating cough, of a ropy clear fluid, sometimes with membraneous threads. It very seldom happens that the inflammation of the larynx and trachea, constituting the croupy complication, occurs without some degree of inflammatory action being extended to the bronchi, or even to a portion of that substance of the lungs. When a fatal termination occurs in this state of disease, the air-passages present more or less of the usual marks of inflammatory action, and are loaded with a thick tenacious mucus, or contain false membranes, or both.

22. B. *Measles with predominance of Gastric and Bilious Disorder.* — *a.* This form was first described with accuracy, and the importance of attending to its character pointed out, by Stoll. It is chiefly marked by accumulations of sordes in the stomach and bowels; by loaded tongue; pain and tenderness at the epigastrium, hypochondria, and bowels; by morbid, bilious, and offensive alvine evacuations; by the great severity of the cough; by depression of the energies of the frame; the slower and less abundant eruption on the skin; by weakness and frequency of pulse; and by severe pains in the loins, limbs, and forehead. It sometimes characterises summer and autumnal epidemics, particularly during or soon after warm and moist seasons; and it occurs sporadically in weak children during the periods of the first and second dentition; in the imperfectly nourished, and in those who have had their bowels long neglected.

23. *b.* This form of measles is frequently *complicated* with *irritation* of the mucous surface of

the *stomach*, or with *disorder* of the *liver*. But, when this latter organ is principally attacked, it is more generally *congested* than otherwise affected. The complication of this modification of measles with *gastric irritation* is very frequent in children during the periods of dentition, and is generally indicated by nausea and vomiting, tenderness or pain, or heat at the epigastrium; an imperfect, impeded, or irregular state of the eruption, and its premature disappearance. *Congestion of the liver* is much more seldom met with, and chiefly occurs in older subjects. It is generally attended by pain and fulness in the right hypochondrium, sallowness of the countenance, an irregular and morbid state of the alvine evacuations, and a dark, muddy state of the urine.

24. *c. Diarrhœa* is not an infrequent complication in this form of measles. It may appear early in the disease. When this is the case the eruption is often delayed, or it is scanty, imperfect, or irregular. It may also take place during the period of desquamation, assuming the character at first of a salutary crisis; but, in consequence of error in diet, or exposure to cold, putting on a more serious appearance, or even passing into a state approaching to dysentery. When this occurs, the appearance of the evacuations, and the state of the cutaneous surface, require the attentive examination of the practitioner, as being the chief guides to this state of the disease, and to successful treatment. Dr. ABERCROMBIE, of Cape Town, described to me an epidemic prevalence of measles in the colony which presented much of this character; the complication with *diarrhœa*, or *enteritis*, or dysentery; or the supervention of these during the decline of the measles, or even some time after recovery from that disease, being very frequent and uncommonly fatal.

25. *C. Measles with predominance of the Nervous Character.* — In this form of the disease the patient is, from the commencement, much depressed in mind; is severely affected with chills and rigors, which pass into a burning heat, with inquietude, general pain and lassitude, particularly about the loins and limbs, with delirium or somnolency, leipothymia, harsh heat and dryness of the skin, and dry loaded tongue. The eruption sometimes appears as early as the second or third day, frequently with convulsions, and rapidly extends to all parts of the body. The patches of the eruption are scarcely at all, or only slightly, prominent; are paler than the regular disease, and more readily disappear. The febrile and nervous symptoms are never diminished; but, on the contrary, encreased by the eruption, particularly if it disappear prematurely, or is repelled by any cause. Sometimes, still more severe and frequently fatal symptoms accompany this form of the disease; such as dyspnœa, dry cough, anxiety, oppression at the chest and præcordia, cardialga, dryness and trembling of the tongue, dryness and redness of the fauces, loss of voice, vomiting, loss of recollection, with stupor, starting of the tendons, tumefied abdomen, very quick, weak, soft, and open pulse, and a crude scanty urine. The character of the disease so nearly approaches to the typhoid type of fever, that it has been termed by several authors typhoid measles. Critical evacuations sometimes occur towards its close, or abortive efforts at evacuation, occasioning fatal determination to some weakened organ, or subsequent visceral disease, which can be removed with great difficulty only. The cuticle is frequently not thrown off in this form of measles.

26. Measles with the nervous character occurs generally at the same season and in the same class of subjects as the foregoing variety (§ 22.). It characterises certain epidemics, particularly those which occur at the same period as epidemic continued fever; and it evidently evinces a more marked determination of the febrile action towards the large nervous centres, particularly the substance and membranes of the brain. This determination is often remarkably encreased about the eruptive and subsequent stages, or upon the imperfect appearance of the eruption, or its repression.

27. *D. Measles presenting a malignant or septic character.* — *Rubeola maligna; R. Putrida; R. Septica;* Auct. var. — To many of the symptoms which I have detailed, as marking the *nervous form* of measles (§ 25.), are generally superadded, most commonly during the stages of *eruption* and *florescence*, or occasionally somewhat later, the eruption of petechiæ, lividity and soreness of the fauces and throat generally; an exudation, or more copious flux of dark decomposed blood from the nostrils, mouth, or vagina; a profuse and exhausting diarrhœa; dark offensive motions; dysenteric symptoms, and viscid perspirations. The measly eruption becomes, either previously to, or contemporaneously with, the above symptoms, discoloured, of a deeper and darker red, or livid; and the cuticle is readily rubbed off upon the decline or detumescence of the papulæ. This form of measles presents a similar state to that of purpura hæmorrhagica, or of land scurvy, complicated with the exanthematous fever.

28. Malignant measles occurs chiefly in hot, warm, moist, and miasmatous climates, in close or crowded localities; and during hot and moist seasons, in cachectic habits, in the ill-fed, or in those in whom the energy of the digestive and assimilatory functions is greatly impaired, and who have been subjected to those agents which act most injuriously on the powers of life and the tonicity of the moving fibres; contaminating the circulating fluids, and occasioning the liquescence of the soft solids of the body. I have seen it prevalent in the natives of warm climates, and in those who inhabit marshy, moist, and miasmatous districts, both in temperate and warm seasons. I have likewise observed it in natives of some of the northern countries of Europe who have been imperfectly fed, and whose only animal food consisted of fish, frequently stale, and eaten with little salt; or who have lived in ill-ventilated, and low apartments. The nervous form of measles occurs most commonly in scattered or isolated cases, whilst the malignant variety more commonly presents an epidemic character, the former more evidently depending upon individual predisposition; the latter to more generally prevailing causes, as unwholesome food or modes of living, general scarcity of provisions, deleterious miasms, and epidemic constitutions of the atmosphere.

29. *E. Of certain irregularities often presented by measles.* — *a.* Sometimes the eruption is more

languid, or *retarded* beyond the usual period. It may likewise be *precocious, precipitous*, or *irregular*, as to the parts on which it appears, and the succession of its progress. The form and character of the eruption may differ greatly: it may be very pale or very red, dark red, or even livid, as in the malignant form; it may likewise be scarcely perceived rising above the rest of the cutaneous surface, nearly smooth; or it may be very prominent and rough to the touch, and discrete; or it may coalesce so closely as to appear confluent. As respects the period of its disappearance, this may be premature, and the desquamation subsequently be either imperfect or altogether wanting.

30. *a. Measles without the catarrhal symptoms — Morbilli sine catarrho* auctorum — not infrequently occur during the epidemic appearance of the disease; or an eruption presenting all the characters of measles sometimes is met with, but without the usual catarrhal symptoms, and without, or with slight febrile commotion. This variety was first described by WILLAN; and as it does not protect the constitution from the regular form of measles, it is considered by FRANK, HILDENBRAND, and WILLIAMS as *spurious*, and as an eruption only resembling measles, and symptomatic of gastric disorder. Dr. G. BURROWS, however, thinks that this objection cannot be admitted; for, besides the opinion of WILLAN, BATEMAN, and others, that it is a distinct variety, the recurrence of measles in the same person has been seen by these and other writers. In the most of the cases of this eruption that I have observed, the stages of the disease wanted the regularity of true measles, and the desquamation was not so marked or complete as in them. In many also of the imputed instances of a second attack of measles, some doubt may be entertained as to one or other having been the regular disease. I believe, however, that I have seen instances of an undoubted second attack.

31. *b. Measles without the eruption — Morbillous fever without the exantheme. — Febris morbillosa sine exanthemate*, HILDENBRAND. — Several writers have contended, that, during the epidemic prevalence of measles, some children may have all the catarrhal and febrile symptoms of measles, and yet no eruption will appear, such children notwithstanding being protected against a subsequent attack. I have met with two or three instances, when measles was prevalent in a family, of one of the children having all the catarrhal and constitutional symptoms, without any eruption appearing, and have attributed this to impaired vital power, to an anæmic state of the vascular system, and to impaired vascular action, probably also associated with predominant disorder of some internal viscus. I have seen other instances where the disease has advanced far, the febrile symptoms having continued for several days, when a scanty, imperfect, or evanescent eruption has at length appeared after the exhibition of stimulants or tonics.

32. *c.* The connection of *hooping-cough* with measles has frequently been remarked upon. Indeed the occurrence of measles sometimes presents a very intimate association with pertussis, the epidemic appearance of the one being frequently followed by the other, and the attack of the one being often followed closely by the other, in the same subject. Some physicians, as DE HAEN and MACBRIDE, conceive that they have seen measles associated with *small-pox* in the same person. But I agree with REIL and HILDENBRAND in considering this opinion to have originated in mistake.

33. III. The TERMINATIONS OF MEASLES.—i. *Resolution* or *restoration* to the healthy state usually takes place from the resistance which the vital energy opposes to the morbid changes characterising the disease, and to the influence of this energy on those organs which are the emunctories of the frame. When the train of phenomena is not interfered with, the disease frequently, about the seventh or ninth day, presents some critical evacuation, which tends greatly to the restoration of the healthy functions, especially a copious and general perspiration; a paler and more abundant secretion of urine, which deposits a copious sediment; diarrhœa continuing for two or three days, but readily becoming hurtful if it be not judiciously managed; a copious discharge of mucus, which often removes the remaining irritation of the bronchial surface with the hoarseness; and the furfuraceous discharge and transpiration which takes place from the cutaneous surface after the exfoliation of the cuticle.

34. ii. *The sequelæ of Measles.* — *A.* Sometimes, not only the irregular and complicated states of measles, but even the more benign and regular form, leave after them, without any evident cause, various diseases which place the lives of patients in great hazard. The chief of those are pulmonary consumption, the result either of a chronic state of the bronchitis which had accompanied the measles, or of organic lesion of the substance of the lungs, the consequence of the complication of the disease with pneumonia, or with broncho-pneumonia, readily passing into chronic pneumonia, or of tubercles which had been developed during its progress and decline, or which had previously existed. It is by no means rare to observe both pneumonia and pleuritis, or both conjoined, supervene during the period of desquamation. The accession of the former especially is often extremely furtive and latent. I have frequently seen patients brought to the Infirmary for Children with the most severe attacks of pneumonia, in an advanced stage, with all the symptoms fully developed, following an apparently mild form of measles; and other cases, which had manifestly been advancing for several days in a concealed manner, and gone on to serious organic change before the parents had been alarmed. These latter are very frequent during some epidemics, and particularly after the inflammatory form of the disease, although they are not peculiar to this variety, but equally consequent upon the regular, and sometimes on the gastric states of the malady. In cases of this description the practitioner has often no opportunity of watching the accession of the local mischief, which may occur so early in the disease as to be a complication of it, or during the stage of desquamation. I have, however, observed it still more frequently —I may say in many hundred instances presented to me in the institution already referred to — at an indefinite, but no very remote period from the last stage, occurring generally during recovery,

either from an incautious exposure to the air, or to cold, early in convalescence, or from an injudicious management of this period, which, in all exanthematous diseases, requires the particular care of the physician in order to prevent their dangerous sequelæ — often more dangerous than even the original diseases themselves. Improper diet, premature exposures to cold, and even atmospherical vicissitudes, which cannot be sufficiently guarded against, will also frequently occasion the unfavourable consequences now pointed out.

35. *B.* The *Symptoms* indicating the supervention of disease of the lungs are often extremely treacherous, particularly if the local mischief commences early in the disease, and if viewed superficially, or without the aid of percussion and auscultation. They chiefly consist of the persistence of cough, expectoration, frequency of pulse, and febrile exacerbations, after the disappearance of the eruption. Or, the different stages of the measles having been completed, febrile action is rekindled and accompanied with oppression, weight or uneasiness in the chest, with a dry, spastic cough and difficulty of breathing, followed after a time with purulent expectoration, occasionally streaked with blood, evening exacerbation of fever, nightly perspirations, loss of flesh, &c. In those cases which are characterised by a gradual or insensible concentration of diseased action in the lungs, particularly in the mucous surface of the bronchi and air-cells, the expectoration which supervenes in the latter stages, gradually changes from a clear whitish thin fluid, containing numerous white albuminous specks or flocculi, to a thicker, more opaque, tenacious, and muco-purulent matter, till it at last becomes more decidedly purulent; the sputa being each distinct and rounded, less tenacious, not running into each other, and forming a viscid stringy substance, adhering closely to the sides of the vessel, but a yellowish, rounded mass which imparts a whitish, turbid appearance to the water in which it is thrown, from mixing partly with this fluid. But these and other symptoms, although most certainly indicating serious disease of the lungs, give us no precise information as to the extent and nature of the existing lesion. This is only to be acquired from an attentive and repeated examination of the chest by means of percussion and auscultation, and from weighing the evidence thus furnished us in connection with the rational symptoms in the manner pointed out under the articles where these subjects more appropriately fall. The above remarks are equally applicable to the occurrence of pleuritis either as a complication or as a sequela of measles. When pleuritis, or pleuro-pneumonitis, does occur in either of these ways, it is extremely prone to terminate in effusion of a serous fluid into the pluræ, as adhesions are less readily formed in pleuritis when thus complicated than when occurring in an idiopathic form.

36. But effusion into the chest, and even into the pericardium, may be consequent upon measles without any previous signs of inflammatory action. When these results supervene, the disordered state of the respiratory and other functions, and particularly the information conveyed by percussion and auscultation of the chest, will generally point out the nature and extent of mischief. Other dropsical effusions, particularly anasarca, hydrocephalus, and ascites, occasionally are observed as sequelæ of measles, and may be imputed either to encreased determination of the circulation to, with diminished tone of, the extreme capillaries terminating in serous surfaces, or to congestion of the vessels, particularly those conveying the blood from the adjoining viscera and parts. As in anasarca, so also in the other forms of dropsy, the obstruction opposed to transpiration by the state of the cutaneous surface, may determine an encreased exhalation or secretion of serum into the cellular tissue underneath and into the shut cavities. The occurrence of anasarca after measles from granular disease of the kidneys is seldom observed.

37. *C. Enteritis*, in some one or other of its forms, more commonly appearing as muco-enteritis, or commencing in the mucous surface of the intestines, is a not infrequent sequela of measles, either upon the disappearance of the eruption or during convalescence, particularly in some epidemics. In the remarkable epidemic which appeared at the Cape of Good Hope about 1838, where the disease had not existed for thirty years, and which few under thirty years of age escaped, this sequela was much more fatal than the measles itself, although of a very severe form. (See art. INTESTINES, *Inflammation of*.) — *Diarrhœa*, acute or chronic, the former being often inflammatory and passing into enteritis as just noticed, or lapsing into the chronic state, not infrequently with ulceration of the intestines, is often observed consecutively upon measles.

38. *D. Ophthalmia* of a chronic and obstinate character frequently follows the malady, particularly in the fair and scrofulous diathesis. In addition to these, scrofulous sores and affections of various kinds; enlargements and inflammations of the lymphatic and mesenteric glands; aphthæ and ulcerations of the cheeks and gums; furunculi and abscesses of the cellular tissue, and fluor albus, should also be ranged amongst the sequelæ of measles.

39. *E.* When the disease occurs in females who have reached the period of puberty, it may be followed by various irregular forms or manifestations of *Hysteria*, sometimes connected with disorder of the catamenia. Of these, hysterical or nervous cough, occasionally with aphonia, is one of the most common, and always requires a treatment suited to its hysterical character.

40. *F.* A more particular consideration of the above *sequelæ* of measles is not consistent with my limits. The mere reference to them serves to illustrate the nature of the disease, whilst it warns the practitioner as to what may occur, and hence points out to him what should be guarded against. These sequelæ, moreover, show that the inflammatory character of measles is variously modified in respect of the degree of vital energy, and nervous power, with which the vascular system and the tissues generally are endowed, — that all the vital manifestations, and even the cohesion of the textures, are seriously modified in its progress, particularly in certain of its types, — and that whilst morbid action of an acute and febrile kind may exist, even in an extreme grade, it may be at the same time conjoined with great diminution of the nervous functions and vital energies.

41. iii. Not only may *measles terminate in a return to health, and in other diseases tending*

generally to disorganisation, but they may terminate, *in a more immediate manner, in death.* This seldom occurs sooner than the stages of efforcescence and desquamation, but cases have occurred in which a fatal issue has taken place about the period of eruption — congestion of either the lungs or brain, or even both, occurring either alone, or in conjunction with effusion of serum &c. into the air-cells and small bronchial tubes of the former, and in the ventricles and between the membranes of the latter, and quickly arresting the functions of these vital organs. In the later stages of measles death generally occurs in a more gradual manner, and may be imputed — 1st, to inflammatory disorganisation, commencing and rapidly advancing in some vital organ, either as a complication or as a consequence of the general febrile commotion and constitutional affection constituting the disease. In these cases the eruption may be extremely abundant, premature in its appearance and decline; but it is much more commonly either late, extremely scanty, irregular in its course, or even scarcely appearing. — 2d. A fatal result may be occasioned by the extreme degree of general adynamia, or depressed state of the vital energies, owing to which reaction cannot take place sufficient to restore the different functions of the œconomy to their natural state; or the vital manifestations of the different organs are incapable of sustaining the struggle with, and removing the morbid impression made upon, the nervous energies, and through them upon the different emunctories, secretions, and circulating fluids, by the exciting cause of the disease, aided by the different concurrent influences of individual pre-disposition and pre-existing disorder. — 3d. A fatal result may occur in any of the advanced stages of the disease from the combination of these two principal pathological states, either of them existing in a more marked degree than the other, in different cases, in different epidemics, and in different seasons.

42. iv. APPEARANCES OBSERVED IN FATAL CASES OF MEASLES.—These vary according to the nature of the prevailing epidemic, the season of the year, the severity of the attack, and the individual predisposition and state of health at the period of seizure. The lesions detected after death have generally a strict reference to the particular type of the disease, and to the complications which had existed in its course. The *regular* and *uncomplicated* measles never terminates fatally unless serious or dangerous visceral disease occurs on its decline, and ends unfavourably. It is different, however, with the other types or states of the disease.—*a*. In fatal instances of *inflammatory measles*, the lungs always present more or less change. The mucous surface of the air-passages is vascular, of a reddish or dark-red colour, generally in patches of a small size, somewhat softened and turgid, and covered with either a mucous, muco-puriform, or viscid matter. In those cases which have presented signs of the croupy or bronchitic complication, the above appearances are very marked about the larynx, epiglottis, and trachea, and are sometimes accompanied either with infiltration and injection of the sub-mucous tissue, or with a thick, whitish, albuminous exudation, approaching in parts to an imperfectly formed membrane; but this latter is, as far as my observations have gone, extremely rare. The above changes are more commonly observed in the large and small bronchi, where the accumulation of viscid mucus, containing whiter and denser specks of an albuminous appearance, is sometimes very great. Accompanying these states of the air-passages the lungs are often congested with a dark, frequently fluid, or semi-fluid blood, a similar congestion likewise existing in the veins and sinuses of the encephalon. After the more decidedly *pneumonic complication*, serous, or sero-sanguineous infiltration of the air-cells and connecting cellular tissue, hepatisation or condensation of portions of the lungs, purulent infiltration of parts of this organ, or the formation of small purulent collections with disorganisation of the immediately surrounding structure, and, lastly, inflammation of the pleura, are the lesions which usually present themselves. When *pleuritic* symptoms occur during the last stages of the disease and terminate fatally, effusion of a turbid serum to a greater or less extent, injection and softening of parts of the pleura, and more or less lesion of the subjacent lung, are usually observed.

43, *b*. In the *nervous type* of the disease, the brain is generally much more vascular than natural, and occasionally somewhat softer; the veins and sinuses are congested, and serum, in various quantities, is frequently found in the ventricles and between the membranes. The pia mater is also generally more than usually vascular, and the arachnoid more or less opaque. These lesions vary greatly in degree. Sometimes they are most remarkable on the surface of the hemispheres; but I have observed them most frequently about the base of the brain. The extent of morbid change has frequently no relation to the severity of the nervous type during the progress of the disease. In some cases these appearances are very slight, and yet the character of the disease has been marked and severe. In other cases the lesions have been considerable, yet the nervous symptoms have not been proportionately great. It seems as if the manner in which the energies of life are influenced, has an intimate relation to the intensity of disease and the manifestations of the nervous functions in its progress.

44. *c*. In the *gastric* and *bilious* type of the disease, the morbid appearances are generally most marked in the mucous surface of the stomach, intestines, and œsophagus, and consist chiefly of inflammatory injection, in patches or small grouped specks, and of softening or loss of cohesion of the mucous membrane, sometimes with injection and slight infiltration of serum in the sub-mucous cellular tissue. The liver does not often present much appearance of disease, — seldom more than slight injection or congestion of the portal and hepatic veins,— the biliary derangement when it accompanies the disease being more functional than inflammatory.

45. *d*. I have had occasion to observe a few inspections of fatal *malignant* measles, but only three in this country where this character was marked. The most remarkable features in these inspections were the softness of the tissues and the facility with which they might be torn — characters in which even the heart itself participated. The serous cavities sometimes contained a small quantity of serous fluid of either a turbid or sanguineous appearance. I have observed this kind of effusion in the pericardium, but more frequently in the

pleura. The lungs were generally congested, and the mucous surface of the bronchi, as well as some parts of that of the digestive canal, were of a darker colour, even without any very marked injection of the vessels further than engorgement of the small veins, than in other cases of the disease. The bronchial mucous surface presented, in parts, small livid or purple ecchymoses, similar marks also sometimes appearing in the fauces, stomach, and cæcum.

46. The veins and sinuses of the brain were generally engorged with a dark, semifluid blood. The auricles and large veins contained blood in a similar state. The surface of the body was livid in parts, mottled, and dotted with petechiæ of a dark colour, approaching to the characters of purpura hemorrhagica.

47. v. *Tissues most uniformly affected in Measles.* — The structures specifically affected by this disease are the rete vasculosa of the skin, the mucous membranes, particularly those lining the air-passages, and, in a lesser degree, those of the fauces and stomach. The redness observed in the mouth and throat during the stages of eruption and florescence is seldom so intense as in scarlatina. The other lesions of structure observed after measles may partly be attributed to the interruption of those functions performed by the cutaneous and mucous surfaces, and to the consequences thereby produced on other organs associated with them in action, together with the influence of the efficient cause of the disease on the nervous and vascular system, on the circulating fluids, and, indeed, on all the vital manifestations, and even on the organisation of the frame. These latter, or more extreme changes, however, are chiefly manifested in the more severe or malignant cases, and are not dissimilar from those which take place in the advanced course of low or adynamic fevers, whether exanthematic or simply continued.

48. IV. Diagnosis.—An exact knowledge of the symptoms and course of the disease in each of its stages, and in all the states and forms it may assume, having at the same time regard to its origin, its causes, and the character of the reigning epidemic, will generally enable us to distinguish it from all other maladies of a similar kind. — *a. Miliary fever* will seldom be confounded with measles, as its phlyctenæ, containing a serous or whitish fluid, scarcely ever appear on the face, and are always accompanied by perspirations of an acid and strong odour. — *b. Urticaria* is distinguished from this disease by the itching attending it, by the larger and more elevated papulæ appearing and disappearing without any order, and by its more fugacious character. — *c.* The *exantheme* frequently accompanying *true or contagious typhus*, particularly as described in the article Fever (§ 500—503.), has a close resemblance to the declining eruption of measles. It is, however, readily distinguished by the history of both diseases, unless when the measles assume the nervous character. In this case the difficulty of diagnosis is much increased. But the more protracted stages of typhus, the profound typhomania, and the persistence of the eruption long beyond the period of its disappearance in measles, with various other subordinate features, will generally point out its nature to the attentive observer. — *d.* The early stages of *small-pox* may also be mistaken for measles; but the marked catarrhal symptoms ushering in the latter, the troublesome cough, the small size of the stigmata, their superficial, slight, and less circumscribed character, and the absence of hardness, will readily distinguish them from the incipient eruption of small-pox.—*e.* The diffused, comparatively smooth, light, scarlet redness, the severe affection of the fauces, the early appearance at once over all parts of the body, and its occasional sudden subsidence and return, the burning heat and dryness of the eyes, and the tendency to affection of the digestive mucous surface, mark *scarlet fever*, with which, however, measles have many points of resemblance, fully pointed out under that disease. It has been remarked by Ziegler, and my own experience confirms the justice of the observation, that whilst measles evince a disposition to affect the respiratory apparatus, scarlet fever has a manifest tendency to disorder the cellular tissue. I may add to this, that this latter disease is more intimately associated with a disordered state of the digestive mucous surface, and that this surface is more liable to be diseased in the severe forms of the malady, or after the sudden subsidence of the eruption, than is usually observed to occur in measles. —*f.* As to *rubeola*, or that intermediate disease between measles and scarlet fever, I will not here point out its distinguishing characters from either one or the other, as this subject is more fully considered in the article Rubeola. — *g. Roseola* is often distinguished with some difficulty from measles; but it may generally be recognised from the circumstance of its being generally sympathetic of dentition, dyspepsia, and a disordered state of the digestive organs. It is very seldom preceded by any very marked fever, or depression of the voluntary powers and vital actions, and is not accompanied by the catarrhal symptoms characterising measles. It does not superinduce the morbid affections so frequently observed after this disease.

49. V. Prognosis. — The *prognosis* in measles is in many respects dependent on the type and complication of the disease. Measles is generally less dangerous than the small-pox and scarlet fever. The *benign* or common form is scarcely attended with any danger, unless as respects its sequelæ, or when officiously interfered with. The *gastric form* of the disease is more serious, but this seldom presents much danger if it be judiciously managed. The *inflammatory state* should lead us to give a cautious opinion of the result, particularly if it be complicated with croup, bronchitis, pneumonia, pleuritis, or hæmoptysis. Of these croup, pneumonia, and hæmoptysis, especially the last, are very dangerous complications. I have met with several cases of hæmoptysis in the different stages of measles, but the larger proportion of them has terminated fatally sooner or later, under treatment varied according to the features of each case. The *nervous* and *adynamic* or *malignant* forms of the disease are seldom devoid of danger, particularly the latter.

50. Much also depends upon the *character of the reigning epidemic*, which usually, indeed, assumes some one of the varieties into which I have divided the disease. Some epidemics are so mild as scarcely to cause any apprehension as to the result. Others are so severe as to lead us to

dread either the immediate or more remote consequences. PERCIVAL states that 91 died out of 3807 cases. WATSON had in the London Foundling Hospital 1 death in 10 cases, and in another year, 1 in 3. In 1793, 6 cases died out of 69; and in 1794 none died of 28 cases, in this institution. In 1800, out of 66, 4 died. These results confirm the calculation of HOME, who estimated the deaths at 1 in 12. The *seasons* have also some influence, but chiefly in sporadic cases; for, during the epidemic prevalence of the disease, their tendency is lost in the more predominating character it then assumes. Winter, however, is a less favourable season for the disease than summer and autumn.

51. *a.* A premature or retarded eruption generally indicates a severe disease, and one disposed to an irregular form and complicated state. An obstinate, severe, and hoarse cough, accompanied with difficulty of breathing, and much febrile action, prolonged beyond the period of desquamation, evinces a serious affection of the lungs, and danger. Tumefaction of countenance; a pale, yellowish eruption, intermingled with petechiæ; copious perspirations without relief of the symptoms, but indicating relaxation of the tissues and of the tone of the extreme vessels; profuse diarrhœa; hæmorrhages, particularly those from the air-passages and fauces; livid petechiæ; a dark or livid state of the eruption; gangrenous spots or escars; very great debility or exhaustion; a very frequent, very soft, open, or compressible pulse, or an irregular or intermittent pulse; and the presence of nervous symptoms in a marked degree, particularly spasms or convulsions, are severally most *unfavourable symptoms.* The disease is generally more severe in children during dentition, and in young persons near the period of puberty; also in infants during the first or second or third month. Convulsions preceding the eruption, especially during dentition, are unfavourable signs. Adults who have a tendency to pulmonary diseases, or who have previously been affected with them; those of a phthysical or scrofulous diathesis; persons addicted to the abuse of inebriating liquors, and females in the pregnant or purpureal states, generally experience the disease in a severe form. However, the measles are far less dangerous to pregnant women, than either small-pox or scarlet fever.

52. The sudden disappearance of the eruption, followed by symptoms of internal disease, or by aggravation of pre-existing visceral disorder, is generally followed by an unfavourable termination. The danger is also great in proportion to the extent and confluence of the eruption, and the violence of the attendant fever. The later the eruption is in supervening upon the fever the better; the earlier the worse. Very great lassitude, torpor, and rheumatic pains of the limbs, if experienced long before the eruption, indicate a disease of great severity. Difficult dentition, and whooping-cough, concurring with measles, place the patient in danger. A fatal issue, within the course of the disease, occurs most frequently on the ninth and tenth days. It has been supposed by some writers that measles has become more severe since the introduction of vaccine inoculation; but I agree with HILDENBRAND in considering this to be devoid of foundation.

53. *b.* The *favourable* indications which occur during the disease are, a moderate eruption with a mitigation of the fever; a disposition to an equable moisture on the skin; a moderate or slight cough, with a mucous and easy expectoration; a free and unembarrassed respiration; a free state of the bowels, and moderate relaxation of them towards the close of the disease; hypostatic urine; a regular succession of the changes of the eruption; and no appearance of any irregularity or complication with visceral affection, the existence of which, as I have already shown, often occasions a fatal result at a more or less remote period, owing to the tendency to disorganisation being greater in the local affections occurring than when taking place primarily.

54. VI. CAUSES. — The *infectious* nature of measles is sufficiently demonstrated, and requires neither proof nor comment. — *a.* The *distance* to which the emanation from the body of an infected person may infect a sound one has not been shown, nor, indeed, is it capable of satisfactory demonstration; for it must depend upon the stage and virulence of the disease, and the susceptibility of those exposed to the emanation. It is probable that the infectious effluvium commences to emanate from the subject of the disease from the first appearance of the eruptive fever, and that it encreases in activity until the period of desquamation, after which it declines; but it has not been shown satisfactorily when all power of infection ceases. That the infectious effluvium is formed as early as during the primary fever, and before as well as after the appearance of the eruption, has been proved by several occurrences by which exposure to infection has been limited to certain periods of the malady.

55. *b.* As in other infectious maladies, so in this, the infection is extended and the disease perpetuated, even after periods of its apparent cessation or disappearance, by *fomites*, or by the imbibition and retention, for a considerable period, of the miasm given out by the infected. Dr. WILLIAMS adduces an instance of this, and similar instances on a smaller scale, as respects the results, must have occurred to every physician. A boy from the Foundling Hospital visited at a house where a child was ill of measles. The boy returned in the evening, and mixed with his fellows as usual; but in the course of fourteen days he and sixty boys were ill of the disease. The experiments of HOME, SPERANZA, and others have furnished numerous other proofs of the propagation of the disease by fomites.

56. *c.* Although the chief modes in which the malady is disseminated are emanations proceeding directly from the sick, and emanations absorbed and retained for a time by woollen or porous bodies, and afterwards given out, still it may be spread by *contagion* and *inoculation.* HOME, VOGEL, WACHSEL, BROWN, MONRO, and TISSOT have proved the contagious nature of measles by inoculation, either with the blood, or with the serum taken from the vesicles which are occasionally intermixed with the eruption. It was supposed by some of the physicians just mentioned, that a mild form of the disease was produced by inoculation; but the experiments made by CULLEN, ROSENSTEIN, GIRTANNER, and VAIDY have not confirmed this opinion; and the inoculation of measles has never been even partially adopted.

The latest trial seems to have been made by Speranza in 1822, who inoculated seven persons, who had the disease regularly and mildly.

57. *d.* The *latent period*, or the time which elapses from the impression of the morbid effluvium on the sound constitution until the appearance of the eruption, varies from six to twenty-one days. In the cases of the inoculated disease, the eruption appeared on the sixth and seventh days. (See art. Infection, § 31.)

58. *e.* The morbid seminium or poison of measles may *co-exist* with some other morbid poisons, as observed by various pathologists. Macbride states, that he occasionally saw measles and small-pox in the same patient at the same time, and that the combination was generally fatal. The co-existence of these maladies, either taking the precedence, has been noticed also by De Haen, Vogel, Horn, Pinel, Bateman, and Willan. The co-existence of cow-pox and measles, and of hooping-cough and measles, is not infrequent.

59. *f.* The morbillous miasm, having produced its specific effects, leaves the frame exempted from a second attack. But this exemption is not universal. It is so general, however, as to induce such experienced observers as Willan and Rosenstein to believe in its universality; whilst the exceptions to this law are so rare as to be observed only by few, and, probably, in certain epidemics only. Second attacks have been recorded by Burserius, Roberdien, Home, Baillie, Webster, and observed also by the author. It has been fully ascertained that the spurious disease, which has been termed "*Morbilli sine catarrho*," does not protect the system from true measles; but it has not been shown that those cases of morbillous fever, unattended by eruption (§ 31.), admit of a subsequent attack.

60. That the morbillous miasm contaminates the circulating fluids, and even the soft solids, and so infects them as to enable them to propagate the disease, is shown not only by the experiments alluded to above (§ 56.), wherein the fluids communicated the malady, but also by the fact of infants having been born with the morbillous eruption when their mothers have been the subjects of the disease at the period of parturition.

61. As the measles have been said to have appeared at the same time, and in the same country, they have been presumed to have had a similar local origin. But the measles, Dr. Williams observes, now prevails all over the world, occurs at all seasons, and frequently without our being able to trace them to any contagious source; so that we may infer that the morbillous poison is generally diffused through the atmosphere, and at all times of the year. But such can hardly be the case; for, as measles are an *infectious* as well as a *contagious* disease (see art. Infection, § 4.), and are diffused chiefly by fomites, as the fomites retain the morbillous poison for a long period in temperate or cold climates, and as the susceptibility to infection by it is extremely great, in the young more particularly, whilst the period which elapses between the first impression of the cause and the development of the disease is long, so it seems the more probable that the extension of the poison will be rapid, wide, and traced with great difficulty, or not traceable at all, without the general diffusion of it in the atmosphere supposed by Dr. Williams.

62. A few years ago, the measles were introduced into the Cape of Good Hope, where they had not appeared for about thirty years, by a vessel from Europe, in which several cases occurred during the voyage. The disease spread, and with its diffusion, the difficulty of tracing the sources of infection in individual cases encreased; all being susceptible of infection under thirty or thirty-one years of age. The heat and dryness of the climate during several months of the year being unfavourable to infection, the malady soon disappeared after those susceptible of it had become infected, few remaining liable to it but infants born after its introduction into the colony.

63. *g.* As to the *origin* of the disease, nothing more credible than supposition can be adduced. Kircher, Linnæus, and Nyander ascribed this disease, as well as small-pox, plague, &c., to swarms of minute insects in the atmosphere. The probability of its origin in a miasm proceeding from numbers of persons breathing a confined air with their cattle, has been hinted at by Hildenbrand. "In diversis ac dissitis villis, præsertim in vaccarum stabulis, in quibus plures sæpe familiæ unacum prolibus unitæ totam ferme transigunt brumam, morbillosum emicare vidimus contagium eousque vigens, donec plurimis individuis infectis, talique pacto hominum dispositione extincta, exhausto igitur quasi solo, in quo radices figere posset, in lethargi speciem cadat, data recenti occasione denuo ad activam vitam surrecturum. Nostra quoque sub zona huncce fomitem contagiosum in morbis catarrhalibus gravioribus, opitulante constitutione annua, vel specifica plurium hominum et animalium cohabitantium mephite, primitus oriri posse, conjectura quidem foret, nobis omnino non improbabilis, quam tamen ob defectum observationum defendere nondum auderemus." (*Instit. Pract. Med.* t. iv. p. 359.)

64. *h.* The *predisposing causes* of measles are chiefly the epoch of childhood, or any period antecedent to puberty. But a susceptibility of, or predisposition to, the disease, exists in all persons who have not been infected by it; probably, however, decreasing with the progress of age after the period of puberty. The influence of *season* is not strikingly manifested, as the disease may be epidemic in any season in temperate climates. According to the Report of the Registrar-general, the deaths from measles in the metropolis were 173 in the first, 96 in the second, 94 in the third, and 251 in the fourth three months of 1838; — 251 in the first, 623 in the second, 782 in the third, and 380 in the fourth three months of 1839; — 194 in the first, 275 in the second, 308 in the third, and 355 in the fourth three months of 1840; — 158 in the first, and 147 in the second three months of 1841.

65. Although the prevalence of measles appears to be but little dependent on season, still some influence may be imputed to it — an influence much insisted upon by Sydenham and others, who considered that the disease was usually most prevalent during the first half of the year. More influence is evidently owing to certain epidemic constitutions of the air, which are manifested chiefly by their effects, than to either season or weather; for, at all seasons, and in all kinds of weather, merely occasional cases of the disease

may present themselves; and these only may appear for a long period; when suddenly the disease may assume an epidemic form, without any circumstance in the weather or season being observed that can account for the change. Generally, however, measles are epidemic, when catarrhal affections are also prevalent; and a frequent connection has been remarked between epidemic hooping cough and this disease.

66. VII. TREATMENT. — The scope and object of the treatment of measles are, — 1st, to moderate and preserve the vital actions; — 2d, to subdue or soothe the more troublesome symptoms; — 3d, to aid and direct critical efforts, and prevent unfavourable determinations or metastases of morbid action; — and, 4th, to prevent or remove the sequelæ or morbid effects of the disease. These *intentions* nearly agree with those mentioned by HILDENBRAND. The more general *indication*, however, *to alleviate unfavourable symptoms as they arise*, comprises the whole of the foregoing.

67. *a*. During the eruptive stage, it is chiefly necessary, as Dr. G. BURROWS well observes, to pay attention to the regular action of the bowels, to confine the patient to bed, in a moderate temperature, and to a light farinaceous diet, with cooling and demulcent drinks. The heat of skin preceding the appearance of the eruption is best treated by moderate doses of the liquor ammoniæ acetatis, and spiritus ætheris nitrici in camphor mixture: the external application of cold at this period is not unattended by risk, especially of encreasing the bronchial and pulmonary symptoms.

68. In mild cases no further means than the above are requisite throughout their course. WILLAN, however, prescribed an emetic on the second or third evening, conceiving that it alleviated the violence of the catarrhal symptoms, and tended to prevent the diarrhœa which usually succeeds the disease; and Dr. FOTHERGILL administered repeatedly antimonial emetics. This latter plan, however, requires caution, and is suited only to cases in which the tracheal or the bronchial and pulmonary affection is considerable, and the accumulation of mucus and muco-albuminous matters in the bronchi is great and expectorated with difficulty. Dr. WILLAN remarks, that he has not observed any considerable effect from antimonials, or other diaphoretics during the eruption; that bathing the feet every evening seems more beneficial; and that emulsions and mucilages afford little or no relief to the cough and difficulty of breathing.

69. *b*. In the *inflammatory state* of the disease, in which the bronchial membrane, and even the substance of the lungs, the conjunctiva, &c. are the seat of congestive inflammatory action, *blood-letting*, general or local, or even both, is requisite; but, unless symptoms of inflammatory action present themselves, this measure should be reserved. SYDENHAM directs blood-letting when the fever is violent, with difficulty of breathing, and other pulmonic symptoms. CULLEN remarks that, as the symptoms of pneumonic inflammation seldom come on during the eruptive fever, and as this fever is sometimes violent immediately before the eruption, though a sufficiently mild disease be to follow, so bleeding is seldom necessary during the eruptive fever, and may often be reserved for periods of greater danger. WILLAN and BATEMAN are adverse to bleeding early in the disease, because oppression of breathing, with labouring pulse on the first or second days of the eruption, usually disappear in the course of twenty-four hours. But when the eruption has disappeared, and the cough, pain of the chest, and difficulty of breathing become severe, bleeding and cupping become necessary. When, however, the symptoms are decidedly inflammatory early in the disease, bleeding ought not to be deferred, for it may be too late if it be put off until the eruption has disappeared. As to the quantity of blood which may be taken, no directions ought to be given. It always should be regulated by the character of the epidemic, and the states of vital power and re-action. Patients in large cities and manufacturing towns cannot bear losses of blood equally with the well-fed, and those breathing a pure or country air; nor is even the inflammatory state of this disease equally tolerant of vascular depletion with primary or pure pneumonia or bronchitis. As in all diseases which are produced by an infectious or contagious miasm, so in this, although in a somewhat less degree than in some, bloodletting should be practised with caution; and even the inflammatory complications they may present or induce are less under the control of, and are less benefited by, this treatment, than inflammations which are not thus produced, and not so allied.

70. The opinions of writers as to the propriety of bloodletting in measles have been influenced chiefly by the characters of the epidemics which came under their observation; for, whilst most writers of reputation admit the propriety of this measure in the inflammatory state, they equally condemn it when no such condition exists. HAMILTON, MURRAY, and others did not have recourse to it, probably in consequence of the non-inflammatory nature of the epidemics they had to treat; whilst MORTON, MEAD, HEBERDEN, HORN, FERGUSON, ARMSTRONG, and others considered that bleeding should form a part of the treatment of the disease, manifestly owing to the inflammatory form of the epidemics which they observed. HEBERDEN advised it whenever the breathing is oppressed. MEAD states that "about forty years ago the measles raged with great violence in the city, and were more fatal than even the small-pox;" and that he always opened a vein in the beginning of the distemper, or as soon as he could when called in late, "because the disease always brings with it a peripneumony." MORTON deferred bloodletting until after the eruption is completed, the malady being, in his opinion, most inflammatory at that time.

71. Every observing physician must be convinced that in London especially, and in most very large towns, bleeding ought not to be generally adopted in the treatment of measles, although it may be practised with greater impunity in them than in other infectious maladies; and that it should not be neglected in the pneumonic and other inflammatory states of the disease noticed above (§ 42.). Dr. WILLIAMS justly observes, that we should be content with moderating the symptoms by it; for, as the disease has a specific course to run, a sudden cure ought not to be expected. The bleeding also should be more moderate during the eruption than after its subsidence; for a mitigation of the symptoms may be expected when it disappears. The presence of

menstruation should not deter from bloodletting when clearly required, although it may indicate a more moderate recourse to it.

72. In aid of vascular depletion, when clearly indicated, and even independently of this agent, when the powers of life are too low to admit of it, *calomel* and *opium* with *antimony*, if the *sthenic* condition prevail, or with *camphor* or *ammonia*, if the *asthenic* state is prominent, should be prescribed; and the pulmonic complication otherwise treated conformably with the principles developed in the article on inflammations of the BRONCHI and LUNGS (see these articles).

73. In all cases, particularly when the eruption has disappeared, of visceral affection, or of the prominent affection of any important organ, the application of *rubefacient embrocations, blisters*, &c., in aid of such other means as the characters of individual cases suggest, will prove of service. When the eruption is repelled by exposure to cold, the treatment should depend upon the frequency and strength of the pulse, and the organ chiefly affected; but in these cases, a strenuous recourse to warm diaphoretics, to the warm bath, to which salt and mustard may be added, and to active rubefacients, blisters, and other external derivatives, is more especially indicated.

74. *c.* In the *gastric form* of measles, and particularly if associated with hooping-cough, an ipecacuanha emetic early in the disease, or even repeated in the course of it, is often of service. In these, calomel and the milder forms of mercury, aided by aperients, are generally required to evacuate accumulated biliary and intestinal secretions. If, in this state of the distemper, the eruption be imperfectly evolved, or if it retrocede prematurely or suddenly, the warmer diaphoretics, external rubefacients (§ 73.), &c. should be prescribed.

75. *d.* In the *nervous state* of the disease, particularly when associated with convulsive or spasmodic symptoms, with singultus, stupor, startings of the tendons, &c., cupping on the nape, or leeches applied behind the ears, when the patient is plethoric, or signs of cerebral plethora are present, free evacuations of the bowels, and camphor, with small doses of opium, or with henbane, are generally of great benefit. When the eruption is either delayed or imperfectly evolved in this variety, ammonia, capsicum, æther, various aromatic spirits, and other diffusive stimulants may be exhibited; and, aided by warm mustard pediluvia, mustard poultices, terebinthinate embrocations, and blisters applied only for a few hours. In young children, however, opium and blisters ought to be employed with great caution.

76. *e.* The *septic, putrid*, or *malignant form* of measles requires the exhibition of camphor, ammonia, cinchona, or quinine, the alkaline carbonates, capsicum, the chlorate of potash, the chlorides, creasote, and other medicines of the same kind, variously combined, according to the features of the case. In it, a free use of wine, and small doses of opium, frequently repeated and conjoined with aromatics, stimulants, &c., are generally of use. It has been supposed that local bleedings may be of service early in this form of the disease; but, however early they may be employed, they are of doubtful efficacy. In most respects, the treatment should be directed as recommended for *adynamic* or *putrid* FEVER (§ 559. *et seq.*).—In this variety, the most beneficial external applications are warm flannels moistened with spirits of turpentine and cajuput oil. Blisters are attended with risk.

77. *f.* When *diarrhœa* follows the disappearance of the eruption, diaphoretics with gentle anodynes, as with syrup of poppies, or the paregoric elixir; the warm bath, rubefacient embrocations on the abdomen, and mucilaginous or farinaceous articles of diet, are most appropriate. If the diarrhœa be slight, and the evacuations fæculent, small doses of hydrarg. cum creta, of ipecacuanha, rhubarb and magnesia, are most beneficial, and should be occasionally given, even when it is found requisite to restrain the action of the bowels by the means just mentioned.

78. *g.* If *pneumonic* or *bronchitic symptoms* follow the disease, the means advised for similar states of pneumonia or bronchitis, according to the strength of the patient, and to the severity of such consecutive disease, must be employed. In most of these cases, external derivatives, and the warm terebinthinate embrocation, are very serviceable, particularly after bloodletting has been sufficiently but cautiously practised.

79. *h.* During the course of the disease, a low *diet* should be enjoined; and even in the mildest cases small quantities only of farinaceous food, or rice, arrow-root, &c., should be allowed. *Fluids* should be taken at nearly a tepid temperature. Whey, barley-water, and other demulcent drinks may be given. In the adynamic and malignant states of the disease, Seltzer water, soda water, with sherry negus, &c., may be allowed. The chamber should be of a moderate temperature, and be kept free from currents of air, or changes from heat to cold.

80. *i.* No fully ascertained means of *preventing* the disease have yet been demonstrated. Inoculation does not promise any advantages. M. TORTUAL has recommended the internal use of sulphur as a prophylactic; but its influence has not yet been satisfactorily shown.

BIBLIOG. AND REFER. — *Avicenna*, Canon. L. iv. Fen. i. tr. iv. cap. 8. — *Fracostorius*, De Morb. Coutag. c. ii. — *N. Massa*, De Febre Pestilentiali, Morbillis, &c. 4to. Venet. 1540. — *M. Donatus*, De Variolis et Morbillis, 4to. Mant. 1569. — *F. Alphani*, De Pestilentia, Variolis et Morbillis, 4to. Neap. 1577.; in *Haller*, Bib. Med. Pract. t. ii. p. 208. — *A. Porti*, De Peste, Variolis et Morbillis, 4to. Ven. 1580. — *H. Augenius*, De Curat. Variol. et Morbillorum, fol. Venet. 1605. — *Riverius*, Observ. cent. ii. no. 45. — *G. Horst*, Bericht von Kinderblattern und Massern, 8vo. Giess. 1621. — *Zacutus Lusitanus*, Prax. Admir. l. iii. obs. 48. — *D. Lipsius*, Bericht von den Kinderblattern und Massern, 8vo. Erf. 1624. — *G. Arthusius*, De Variolis et Morbillis, 4to. Arg. 1630. — *Ballonius*, Opera, t. i. p. 41. 125. — *G. Dwinnus*, van de Kinderpoken en Masern, 8vo. Briel, 1651. — *Scnnertus*, De Febribus, l. iv. c. 12. — *N. Chicot*, Epist. et Dissert. de Variolar. et Morbill. Ortu, &c. 4to. Paris, 1656. — *Sydenham*, Opusc. p. 247. — *Fromann*, De Venæsectione in Declinatione Morbillorum Oborta Pleuritide, 8vo. Lips. 1668. — *Bartholinus*, Epist. iii. p. 98. — *Morton*, De Febr. Inflammat. c. iii. — *A. Sidobre*, De Variolis et Morbillis, 12mo. Lugd. Bat. 1702. — *J. Buggaert*, Over de Kinderpocken en Masselen, 8vo. Amst. 1710. — *Fuller*, On Eruptive Fevers, especially the Measles and Small-pox. Lond. 1730. — *R. Mead*, De Variolis et Morbillis Liber: Accessit Rhazis Commentarius, 8vo. Lond. 1747. Translated by *T. Slack*. 8vo. Lond. 1748. — *Lentin*, Memorabilia, &c. p. 82. — *Douet*, Traité des Fièvres Malignes, la Rougeole, &c. 12mo. Paris, 1753. — *F. Home*, Medical Facts and Experiments, 8vo. 1758. p. 268. — Thoughts on the Anomalous Malignant Measles, in the Western Parts of England. Lond. 1760. — *J. A. Goulard*, Du Traitement et de l'Extinction de la Variole et de la Rougeole, 12mo. Lyon, 1768. — *Linnæus*, Diss. Exanthemata viva; in Amœnitat. Academ. vol. v. n. 82. — *Selle*, N. Beyträge, b. i. p. 117. — *T. Dickson*, Defence of

Sydenham, &c. in Med. Observ. and Inquiries, vol. iv. 1772. — *W. Watson*, Account of the Putrid Measles, &c. in ibid. vol. iv. p. 132. — *Percival*, in ibid. vol. v. p. 282. *Gruner*, Antiquit. Morbor. p. 54. Vrat. 1774.—*Lieutaud*, Précis de Médécine, p. 604. — *Lorry*, in Mem. de la Soc. R. de Médécine, ad 1776. p. 12. — *Dub. de la Robardiere*, Recherches sur la Rougeole, 12mo. Paris, 1776. — *Keller*, De Diag. Febr. Exanthem. et Hist. Epid. Morbill. Ann. 1783. Erl. 1784.; in Journ. de Méd. t. lxvi. p. 514. — *Sims*, Observations, &c. p. 55. — *Heberden*, Comment. in Morb. Hist. et Curat. cap. 65., and in Med. Trans. of Coll. of Phys. vol. iii. p. 1785. — *Ranoe*, in Acta Reg. Soc. Med. Haun. vol. iv. p. 30. — *Bang*, in ibid. vol. i. p. 247. — *Rush*, Med. Inquiries, vol. ii. n. 6.—*Wilson*, Treat. on Febrile Diseases, vol. ii. p. 415. — *Thomann*, Annalen, ad 1800. p. 79. — *G. Ueberlacher*, Ueber die Grundlosigkiet des ersten Schilderung der Roeteln von den Arabern, 8vo. Wien, 1805. — *Reil*, Fieberlehre, b. v. p. 215.; et Memorab. Clinica. Fasc. ii. —*Hinze*, in *Horn*, Archiv. b. iv. p. 527.; et ibid. Mart. 1811. p. 311. — *R. Willan*, Descript. and Treatment of Cut. Dis. 4to. Lond. 1805. — *Marcus*, Magazin für Specielle Therapie, &c. b. ii. p. 347. — *J. G. Bremser*, Ueber Scharlachkrankheit und Masern, 8vo. Wien, 1806.—*Durr*, in *Hufeland*, Journ. der Pract. Heilk. b. ix. st. 4. p. 116. — *Horst*, in ibid. b. xvii. st. 1. p. 69. — *Consbruck*, in ibid. b. xiii. st. 3. p. 37. — *Heim*, in ibid. Mart. 1812. p. 86. — *G. Roux*, Traité sur la Rougeole, 8vo. Paris, 1807. — *Hufeland*, Bemerkungen über Blattern, &c. p. 457. — *Richter*, Therapeia specialis, t. ii. p. 346. — *Brera*, Giornale de Medicina, t. i. no. 4. — *Ferguson*, in Med. and Phys. Journ. May 1809. — *J. J. Reuss*, Das Wesen der Exantheme, 3 tomes, 8vo. Nurnb. 1818.—*J. Armstrong*, Practical Illustr. of Scarlet Fever, Measles, &c. 8vo. Lond. 1818. — *Monfalcon*, Dict. des Scien. Méd. t. xlix. Paris, 1820. — *J. P. Frank*, De Cur. Hom. Morbis, l. iii. p. 238.; et Acta Institut. Clinica Vilnensis. Ann. ii. p. 46. — *Delagarde*, Trans. of Med. and Chirurg. Society, vol. xiii. p. 163. — *Guersent*, Dict. de Méd. t. xviii. p. 509. Paris, 1827. — *Hildenbrand*, Institut. Pract. Med. t. iv. p. 341. — *Bricheteau*, in Archives Génér. de Médécine, t. v. p. 216.; et ibid. t. xvi. p. 103. — *Speranza*, in ibid. t. xvii. p. 605. — *Fortual*, Nouv. Biblioth. Méd. t. v. p. 221. — Medical Gazette, vol. xviii. p. 602.—*F. Corbyn*, Trans. of Med. and Phys. Society of Calcutta, vol. vi. p. 477. — *Montgomery*, Cyclop. of Pract. Med. vol. iii. p. 625. — *R. Williams*, Elements of Medicine, vol. i. on Morbid Poisons, 8vo. Lond 1836. p. 160. — *G. Burrows*, in Lib. of Med. vol. i. p. 327.

MEDIASTINUM — *Inflammation of.* — *Mediastinitis*, Hildenbrand. *Pleuritis Mediastini*, Kerstens.

Classif. — I. Class. III. Order (*Author*).

1. Defin. — *Obtuse pain extending behind the sternum to between the shoulders, with constriction, internal heat, anxiety, dry short cough, and inflammatory fever.*

2. Inflammation of the mediastinum has been distinguished from a similar disease of the rest of the pleura by several authors. When this duplicature of the pleura is inflamed — an occurrence not frequently observed, the diagnosis is extremely difficult. The Arabian physician, Avenzoar, is the first who attempted a history of this disease. According to Friend, he had been afflicted with it. After him Salius Diversus (*De Febri Pest. et Curat. part. Morb.* c. vi. p. 247.) has taken particular notice of it, and recorded several cases in which he observed it. Morgagni, Trombell, Sauvages, Kerstens, Flajani, and Hildenbrand have also contributed much to our knowledge of the disease and the effects it produces.

3. i. Symptoms. — Obtuse and deep-seated pain behind the sternum, and extending to the upper part of the back, between the shoulders, and declining towards the ensiform cartilage. A sense of constriction and internal heat in the same situation; great inquietude and anxiety, thirst, dry cough, or with scanty coloured expectoration, and inflammatory fever. In addition to these, Salius Diversus enumerates short and frequent inspiration, not materially increasing the pain as in pleurisy, unless on a forced respiration; hard frequent pulse; and decubitus on the back.

4. When the disease is complicated with *pleurisy*, which is often the case, or with *pneumonia*, the disease may not be recognised even after attentive examination. If the inflammation extend, or be coëtaneous with *pericarditis* or *carditis*, as post mortem examinations sometimes show (Portal, *Anat. Méd.* t. v. p. 28.), palpitations of the heart, syncope, or leipothymia, quick, tumultuous, irregular pulse, in addition to the foregoing symptoms, will frequently indicate the nature of the complication. Mediastinitis occasionally supervenes in the progress of fevers, and even goes on to suppuration without being detected, until upon post mortem inspection.

5. ii. The Causes of mediastinitis are chiefly external injuries; fracture of the sternum; wounds; the suppression of discharges; the repulsion of chronic eruptions; and the usual causes of *pleuritis* or *pneumonia*. (See arts. Lungs, § 80. *et seq.*, and Pleura.)

6. iii. The Prognosis in mediastinitis should be very guarded. The disease seems more disposed than pneumonia to terminate in abscess; and, even when its violence seems subdued, an unfavourable issue may take place. Vander Wiel (*Obs.* 19. *cent.* ii.) records a case which suddenly terminated fatally on the eighth day, the symptoms having been apparently diminished for a short time before.

7. iv. The Terminations of mediastinitis are, 1st, in resolution; — 2d, in abscess; — 3d, in thickening and induration; — and, 4th, in death — (*a.*) *Resolution* of the inflammation takes place with similar phenomena to those I have stated in *pleuritis* and *pneumonia.*—*b. Death* is generally occasioned by the extension of the disease to the adjoining viscera, and the effects thereby produced upon the functions and organs of circulation and respiration. It may also result from the formation of abscess, or from the consequences of chronic inflammatory action continuing after the more acute symptoms have disappeared. Of these I proceed to take some notice.

8. *c.* Abscess *in the mediastinum* has received the notice of physicians since the time of Galen, who mentions a case of it from a wound. J. P. Petit records an instance of it from a blow on the sternum. Van Swieten details another consequent upon primary inflammation of this part; and numerous other cases are furnished by Balck, Columbus, Linguet, Vicq d'Azyr, David, Blancard, De Fabrici, Portal, &c. The abscess is generally seated in the cellular tissue, connecting the laminæ of pleura forming this partition, and is the consequence of inflammation arising either spontaneously or from injuries, and, according to the observations of the above authors, is often connected with the scrofulous diathesis and the venereal taint. It may also form in the course of idiopathic fevers.

9. *d.* The Symptoms indicating abscess in the *anterior mediastinum* are, after those which I have mentioned (§ 3.) as characterising inflammation, the sensation of cold in the course of the spine, with chills or rigors, followed by flushes of heat or perspirations; deep-seated, heavy, and pulsating pain behind the sternum, and extending between the shoulders; oppression, palpitations, syncope, or leipothymia; slow or hectic fever, with

irregular chills or rigors; dry short cough, difficult, wheezing respiration, inability to lie down, &c., and all the phenomena characterising the presence of purulent formations. If the powers of the constitution continue sufficiently long, the purulent collection endeavours to find its way externally. In some cases it becomes effused into the abdomen, through the anterior triangular space over the centre of the diaphragm. Occasionally it partially detaches the pleura from the sternum and the costal cartilages, and appears externally at one side of the sternum, forming a round, soft, fluctuating tumour. In the case of a boy, aged about six years, who was attended by the late Mr. EARLE and myself, the abscess made its way externally at the right side of the lower end of the sternum, and recovery took place. In other cases the matter, after being long pent up beneath the sternum, destroys and perforates a portion of this bone. In some cases of abscess in this situation the preceding inflammation commences in the sternum itself, or its internal surface, and the caries of it proceeds pari passu with the formation of matter beneath it. In cases of this description, the extent to which the destruction of bone takes place and the external wound are much greater, so much so in some instances that the pericardium has been exposed, the heart appearing through it. The immortal HARVEY showed a case of this description to CHARLES II.; and a similar case was observed by GALEN.

10. Abscess in the mediastinum is always a most dangerous disease, owing both to its proximity to vital organs, whose functions it impedes, and to the difficulty of ascertaining its existence previously to the appearance of the most serious symptoms. The PROGNOSTIC should therefore be given accordingly. The cause in which it originated, the state of the vital energies of the frame, and the existence of scrofulous or venereal taint, will also influence the diagnosis.

11. v. TREATMENT. — *Mediastinitis*, before it has gone on to suppuration, or to any other unfavourable termination, should be *treated* as fully stated in respect of *pneumonia* and *pleuritis*. (See art. LUNGS, § 91. *et seq.*, and PLEURA.)

12. When we have reason to suspect the formation of *abscess*, the occasional application of a few leeches, and persistence in the anti-phlogistic treatment and regimen, particularly in aperients and diuretics, will be serviceable as long as the inflammatory symptoms continue, and the pulse retains much force or tone. In an opposite state of the system, when the pulse is very weak, small, quick, and compressible, and the energies of the system seem insufficient to resist the extension of local mischief, and contamination of the frame, then vegetable tonics and bitters, and the mineral acids, alone or combined with tonics, are indicated. When the abscess points externally it should be opened with a lancet, its contents partially removed, the aperture carefully closed so as to exclude the air, and the operation repeated according to circumstances; employing at the same time the medical treatment just indicated, viz. small depletions, &c., when action is increased; and when the vital energies require support, digestible nourishment and the tonic means now stated, and the various remedies advised in the article ABSCESS (§ 62. *et seq.*).

13. When the purulent matter is confined below the sternum, producing slow destruction of the surrounding parts, with caries of this bone, the majority of authors quoted above recommend the sternum to be trephined, and an external outlet to be thus given to the matter. JUNCKER and PLATNER consider it less dangerous than a similar operation performed on the cranium. DIONIS adduces a case in which death followed the performance of this operation; but this result was probably not caused by it, or even might have been averted by an earlier recourse to it. PETIT, COLON, and LAMARTINIERE consider it the only resource in cases of this description, and one which will occasionally be successful. LASSUS states, in his work on surgical pathology, that he treated a physician who had a fistulous opening above the zyphoid cartilage, from an abscess in the anterior mediastinum, for fifteen months; its enlargement had been recommended by some surgeons. This was prevented, and the patient recovered perfectly a few months afterwards.

14. *Abscess* may also form in the *posterior mediastinum*, though less frequently than in the anterior. In this situation it may be the result of inflammation of the vertebræ, or intervertebral substance, or of caries of the former, or it may originally take place in the connecting cellular tissue, and produce caries of the vertebræ from pressure, constant dysphagia, and disorder of the heart. When occurring in the posterior mediastinum, it may have been *caused* by violent exertion, rheumatism affecting the fibrous structure of the vertebræ, syphilis, scrofula, &c. The symptoms produced are generally more severe, and the result more uniformly fatal, than when abscess forms behind the sternum. Death often takes place suddenly, and then, and frequently not until then, is the cause made manifest.

15. vi. THICKENING AND INDURATION of the laminæ of the mediastinum is generally the result of chronic inflammatory action. Sometimes these changes are so considerable as to approach to the state of cartilage, in which state M. PORTAL found them in a case of hydrothorax, consequent upon bronchitis.

16. vii. OTHER ORGANIC CHANGES in the mediastinum are occasionally met with, especially scrofulous tumours; enlargement of the thymus gland; lardaceous and albuminous formations; collections of fat and fatty tumours; effusions of blood, and serous infiltrations. Instances of these are to be found in the writings of BONET, MORGAGNI, LIEUTAND, RIVIERE, CORVISART, OTTO, &c. I saw an instance in which scrofulous or tubercular depositions in, and enlargement of, the lymphatic glands lodged in the mediastinum occasioned fatal pressure on the trachea, and large blood-vessels. PORTAL records a case in which death was occasioned by a steatomatous tumour formed in the posterior mediastinum, and pressing on the large vessels and nerves.

BIBLIOG. AND REFER. — *Zacutus Lusitanus*, Méd. Pract. Hist. i. lib. i. no. 23. — *Flajani*, Collezione d'Osservazioni, t. iii. obs. 54. — *Balck*, in Journ. für die Chirurg. i. st. 1. p. 61. — *Linguet*, in Abscessu Mediastini Celebranda Sterni Terebratio. Paris, 1742. — *Aaskow*, Act. Soc. Med. Haun. i. p. 205. — *Bonet*, Sepulch. Anat. l. ii. sec. iv. ob. 2. — *Morgagni*, De Sed. et Caus. Morb. Ep. xxi. ar. 46. — *Kerstens*, De Pleuritide Mediastini, 1784. — *De Jussieu*, in Absc. Med. Celeb. Sterni Terebr. Paris, 1778. — *Vicq d'Azyr*, in Ab. Med. Celeb. Sterni Tereb. Paris, 1774. — *Petit*, Œuvres Posthumes, vol. ii. p. 27. — *Portal*, Anatomie Médicale, t. v. p. 29. — *Corvisart*, Journ. de Méd. t. ii. p. 3. — *Colon*

et-*Lamartiniere*, in Mém. de l'Academie de Chirurgie, t. iv. p. 545. — *Hildenbrand*, Institutiones Medicæ, t. iii. Vien. 1823. — Dict. des Sc. Med. t. xxxii. p. 6. — *Richerand*, Nosophog. Chirurgicale, t. iv. p. 185.

MELÆNA. — SYN. *Μέλαινα νοῦσος*, Hippocrates. *Morbus niger*; *Hæmatemesis atra*; *Hepatorrhœa*; *Fluxus spleneticus*; Auct. var. *Secessus niger*, Hoffmann. *Melæna splenetica*, Sauvages. *Melænorrhagia*, Swediaur. *Maladie noire*, *Ictère noire*, Fr. *Schwartze-krankheit*, *Schwartze-galle*, *Schwartze-blutfluss*, Germ. *Melena*, Ital.

CLASSIF. — IV. CLASS. I. ORDER (*Author*).

1. DEFIN. — *Discharges from the bowels, or from the stomach, or both by stool and by the mouth, of a black, or nearly black matter, consequent upon visceral or constitutional disease.*

2. By HIPPOCRATES and the ancients generally the term *Melæna* was applied to the vomiting of black fluids; but, since the appearance of the writings of HOFFMANN and SAUVAGES it has been extended, and chiefly confined to the discharge of a black matter from the bowels. In the above definition I have extended its acceptation, so as to embrace the meaning attached to it by both the ancients and moderns.

3. The black colour of the discharges has been variously explained by writers. By the ancients it was imputed very generally to the altered colour of the bile; and by the moderns, as generally, to the admixture of blood with the secretions and fæcal matters in the bowels. Hence Dr. M. GOOD divided Melæna into *M. Cholæa*, and *M. Cruenta*. When treating of the latter state of this consecutive malady, in the article HÆMORRHAGE, INTESTINAL (§ 190. *et seq.*), I pointed out a *third* source or *variety*, namely, in morbid secretion from the mucous follicles. Dr. GRAVES has illustrated and confirmed this view in his excellent clinical lectures. He remarks that a large man, accustomed to eat and drink largely, passed by stool and vomited enormous quantities of black fluid; and experienced eructations of sulphuretted hydrogen. His tongue was as black as ink. Dr. GRAVES states, that he ascertained by numerous experiments this black fluid to be a secretion from the mucous membrane of the bowels.

4. I. FORMS. — From what has just now been stated it will appear obvious that *Melæna*, in all its forms — 1st, as resulting from the exudation of blood from the digestive mucous surface, or the admixture of it in any way with the contents of the digestive canal; 2d, as proceeding from a thick, viscid, and black state of the bile; or, 3d, as owing to a morbid secretion from the digestive mucous surface and glandular apparatus — is entirely a symptom, or consecutive malady; that it altogether is a contingent phenomenon upon visceral or constitutional disorder, or structural disease.

5. i. The *first, or sanguineous variety of Melæna* I have treated of, at length, in that part of the article HÆMORRHAGE already referred to. It is not, therefore, necessary to discuss this part of the subject further at this place. I may, however, add, that this is the most common form of Melæna; and that a black matter is not infrequently discharged by vomiting and stool in malignant diseases — both those of a local character, as carcinoma of the stomach, and those of a febrile and pestilential nature, as yellow fever (see art. PESTILENCES and STOMACH). But, although this matter is principally owing to an exudation of blood, either partially altered previously to its extravasation, or chiefly or entirely changed subsequently to its escape from the vessels, by admixture with other matters in the digestive canal; still there is reason to believe that the states of the bile and other secretions in those malignant and constitutional maladies, contributes somewhat to the black or very dark hue of these discharges. In some of the many cases of malignant puerperal fever I have seen, the fluids discharged by vomiting and by stool have presented the blackish hue of melæna; and, after the best attention I could bestow upon the subject, I have considered this hue to be owing to the state of the secretions chiefly; in some instances, however, partly to the admixture of a bloody exudation.

6. ii. The *second source of melæna, or altered bile*, has been also attended to in the articles GALL BLADDER and DUCTS and HÆMORRHAGE FROM THE INTESTINES (§§ 193, 194.), and the means of distinguishing between melæna from this and other sources have been there pointed out. In this variety the stools, and sometimes also the matters vomited, present a greenish-black hue, the former being of the consistence and colour of tar or treacle. Two females, the one about, the other above middle age, complained of attacks similar to spasmodic asthma associated with chronic disorder of the liver, and paroxysms resembling the passing of gall-stones or spasm of the gall-ducts, the countenance being sallow and the bowels confined. I prescribed the strenuous exhibition of chologogue purgatives, which brought away pitchy evacuations that assumed a greenish hue when diluted with water, and entirely removed the attacks.

7. iii. The *third source, or the secretion of a blackish substance* from the internal surface of the intestines, is probably of much less frequent occurrence than the foregoing. It may arise in a similar state of the system to that which disposes to the production of *melanosis*; the vital powers, and the state of the circulation and of the blood in the capillaries of the digestive mucous surface and glands, not admitting of the due combination of the carbon of the blood with oxygen, so as to form carbonic acid to be discharged by the lungs; but allowing the carbon to accumulate, so as to exude from the surfaces of secreting and yielding membranes.

8. II. DIAGNOSIS. — As HOFFMANN has observed, melæna is to be especially distinguished by the tormina, spasms, and pain preceding and accompanying the black evacuations, and by the danger in which the patient is placed — a danger frequently becoming more imminent with the continuance of this appearance of the discharges. When, however, it depends upon the excretion of long pent up and altered bile, a rapid recovery often follows the evacuation, as in the cases just noticed, and in others that I have seen. In one of these, the patient, who is still alive, and to whom I was first called about twelve years ago, has had frequent attacks of great severity, the copious, black, treacle-like stools being always followed by recovery; these stools presenting first a dark-greenish, and afterwards a yellowish-green hue, when diluted with water. If the black discharge be blood altered by the secretions, &c., it

usually presents a reddish hue when diluted with water, or with water containing a little carbonate of soda; and when this kind of discharge is put in a small linen bag, and plunged in warm water, the linen is stained of a reddish colour; but when the black fluid, which is excreted from the *third* source mentioned above (§ 7.) is thus treated, the colour is not materially altered. It should, however, be recollected, that various articles taken into the stomach occasion a black appearance of the evacuations, as black puddings, the preparations of iron, and the acetate of lead when it meets with sulphuretted hydrogen gas, &c.; that others give them a red colour, as logwood, bilberries; and some a blackish green hue, as spinach.

9. III. Prognosis. — Melæna is generally a dangerous symptom, unless when it proceeds from the passage of blood in small quantity, or in a half-digested state into the intestinal canal, in some one of the less important cases of hæmorrhage. It may attend epistaxis and hæmatemesis from suppressed menstruation, and then it cannot be considered a dangerous phenomenon; but, in most other cases, and even when it proceeds from biliary accumulations and morbid secretions, it may be viewed as a very unfavourable occurrence. The prognosis, however, should depend upon the particular source of this change, and upon the various pathological conditions, especially the state of vital power, existing in connection with it. When it occurs in the course of low, adynamic, or putrid fevers, or of malignant diseases, it indicates a fatal result.

10. IV. Treatment. — *a.* When the black state of the discharges proceed from *hæmorrhage*, then the treatment recommended for *hæmorrhages from the stomach and intestines* (§§ 142. 184. *et seq.*) is the most appropriate, more particularly the exhibition of spirits of turpentine, as then advised. In addition, however, to the usual remedies employed to restrain the exudation of blood, means are required to support the powers of life; and frequently such restoratives should be of the most energetic kind, as brandy, port-wine, the hot spices, &c.

11. *b.* When the black matter seems to consist chiefly of altered bile, or of morbid intestinal secretions, chologogue purgatives, with stimulants, antispasmodics, restoratives, &c., are then generally required; but the treatment must necessarily much depend upon the previous history of the case, and the existing pathological states. Melæna, from these sources, is a comparative rare contingency upon prolonged disorders or complicated diseases, and should be treated according to the several forms which these assume. (*See more especially on this subject the article* Hæmorrhage from the Intestines, § 200. *et seq.*)

Bibliog and Refer. — *F. Hoffmann*, Diss. de Morbo Nigro Hipp. Opera, supp. ii. 2. Hal. fol. 1701. — *Morgagni*, De Caus. et Sed. Morb. Epist. xxx. art. 14, &c. — *Tissot*, De Morbo Nigro, in *Sandifort's* Theses, vol. i. 12mo. Laus. 176. — *F. Home*, Clinical Experiments, &c. 8vo. Edin. 1780. p. 127. — *L. di Fojano Loli*, Del Morbo Nero, ossia del Flusso gastrico sanguigno Curato, 8vo. Sien. 1788. — *Richter*, Medichin. und Chirurg. Bemerkungen, p. 119. — *M. Zucchirolli*, Osservazioni della Melæna, ossia Morbo Nero d'Ippocrate, 8vo. Fruola, 1793. — *Rubini*, in Giorn. della Sociéta di Parma, &c. t. i. no. 2 — *Fourcroy*, in Mémoires de la Societé de Médécine, t. v. p. 488. — *Barton*, in Philadelph. Med. and Phys. Journ. vol. ii. p. 1. — *Graves*, in Lond. Med. Gazette, Aug. 1837. p. 349. — *Cruveilhier*, Anat. Path. livr. 31. — See the Bibliog. and Refer. to article Hæmorrhage from the Intestines.

MELANCHOLIA. — See Insanity (§§ 106. *et seq.*).

MELANOSIS. — Syn. *Melanosis* (*μελάνωσις*, from *μέλας*, black, and *νόσος*, disease). *Melanotic formations*; *Melanoma*, Carswell. *Fungus Melanodes*, Wardrop. *Degenerescence noire*, Breschet. *Melanose, Cancer mélane*, Fr. *Das Schwartzwerden, der Eingeweide*, Germ. *Melanotic tumours.*

Classif. — IV. Class. II. Order (*Author*).

1. Defin. — *A morbid production of a black or blackish-brown colour, dissimilar from other structures, whether healthy or diseased, occurring in various forms in different parts of the body.*

2. This was described first by M. Laennec (*Bulletin de la Soc. de l'Ecole de Méd.* 1808), Dupuytren, and Bayle, as a distinct disease. It seems, however, to have been previously noticed by Mr. Wardrop, but considered by him as a species of fungus hæmatodes. The division of the several forms of melanosis suggested by Laennec has been very generally adopted; but the results of more recent researches have suggested different, or at least modified, arrangements of these forms. Melanotic formations, Dr. Carswell remarks, may take place in various and different parts of the body; may present much variety of form; and may owe their production to different agents. But, whilst I admit the first and second of these propositions, I dispute the third; inasmuch as it is not applicable to true melanosis, and applies only to that comprehensive classification which comprises, as forms of melanosis, those alterations in the colour and texture of parts produced by the introduction of carbonaceous matter into the system, by the action of chemical agents, and by the stagnation of the blood. These latter alterations have been denominated *spurious melanosis*, and will be briefly noticed in the sequel.

3. I. True Melanosis. — i. Its Seat. — *a.* The *cellular* and *adipose tissues* are the most frequent seat of this disease; and, in them, it occurs in the largest masses and most circumscribed forms. Owing to the distribution or extension of these tissues, it spreads or extends itself, as in the course of bloodvessels, &c. — *b.* When melanosis is found in the *skin*, it is most commonly an extension only of that existing in the subjacent cellular or adipose tissues, and is very rarely a primary alteration of the skin. — *c.* Dr. Carswell believes that this change very rarely occurs in *mucous membranes*, those cases in which it seems to exist in these being really instances of it only in the subjacent cellular tissue. — *d. Arterial, venous, and muscular tissues*; *serous and synovial membranes*; *aponeuroses, tendons, and cartilage*, do not contain melanotic matter as a primary alteration, although they present the dark brown or black colour, arising from contiguity with, or from the imbibition, infiltration, or exudation of, this matter when in a state of fluidity, or from other causes about to be noticed. — *e.* The spongy *bones*, as the sternum, are more frequently affected than the other bones. — *f.* The *liver* is, of all the compound structures, the most frequently the seat of melanosis, ranking in this respect next to the cellular and adipose tissues. — *g.* Melanosis occurs much less frequently in the *lungs* than in the liver, nor does it acquire the same bulk or extent as in that organ. — *h.* It

has been very rarely seen in the *spleen* and *brain*. Instances, however, have been met with by LOBSTEIN and HOOPER, of its occurrence in the latter. —*i*. Melanosis has been occasionally observed in the *eye*, in the *pancreas* and *lymphatic glands*, in the *thyroid* and *parotid glands*, in the *kidneys*, in the *testes*, in the *ovaries*, *uterus*, and *mammæ*. In all these it may exist either alone, or associated with other morbid products.—*k*. Melanotic matter has been detected in the *blood*. Dr. CARSWELL states, that it has chiefly been in the minute veins of the liver that melanosis has been found; the vessels containing this matter appearing like black lines or striæ, or dots, and sometimes in a pencillated form. — *l*. Melanotic fluid or matter is very rarely found on the surfaces of cavities natural or accidental, unless as an exudation from parts underneath, or from the perforation of melanotic tumours.

4. Melanosis is sometimes found *associated with other morbid productions*. BRESCHET, ANDRAL, and LOBSTEIN have met with it in the false membranes formed on serous surfaces; and the last-named pathologist has seen it accompanying ossific deposits in the coats of arteries. It is occasionally found associated with scirrhus, carcinoma, and fungo-hæmatoid formations, not only in the same organ, but even in the same diseased mass. This combination of these morbid productions has induced some writers to consider melanosis as a species of cancer; but the incorrectness of this opinion will appear in the sequel.

5. ii. THE FORMS OF TRUE MELANOSIS. — These are altogether *four*: — 1. the punctiform; — 2. the tuberiform; — 3. the stratiform; and, 4. the liquiform. — *A*. The *punctiform melanosis* is that in which the black colouring matter appears in minute dots or points, grouped together, or scattered over a considerable extent of surface. This form agrees with that which LAENNEC denominated the *infiltrated*. Dr. CARSWELL states, that this is most frequently met with in the liver, the cut surface of which appears as if dusted with soot or charcoal. Under a lens the black points appear stellated or pencillated, and in some instances are distinctly seen to originate in the ramiform expansion of a minute vein filled with black matter. In other instances, the black substance appears to be deposited in the molecular structure of the organ. This form is not met with in the brain, nor in the cellular, adipose, serous, and fibrous tissues.

6. *B*. *Tuberiform melanosis* is by far the most common form of the disease. It varies in *size*, from that of a pin's head to that of an orange in man, or to that of a melon in the horse. The great size which these tumours sometimes assume is owing to the agglomeration of a number of smaller tumours, the size varying with the number and size of the constituents. The *form* of these tumours is spheroidal or ovoid when single, and generally lobulated when aggregated. The single tumour occurs most frequently in compound tissues and organs; the aggregated in the cellular and adipose tissues. Both the single and aggregated melanotic tumour may be either *encysted* or *non-encysted*. In the latter, the black matter is in immediate contact with the tissue of the part. In the former, the cyst is formed of condensed cellular tissue, stretched out around the contained matter, and forming a thin transparent envelope to it. Encysted melanotic tumours do not occur in a very perfect or distinct state in any of the compound tissues or organs; but chiefly in cellular and adipose tissues, owing to the nature of these tissues. The melanoid tumours found occasionally on the surface of the peritoneum and pleura, and there even assuming a pedunculated or polypous appearance, seem to be developed, in most instances, under the serous membrane, carrying the membrane before and around them, it thus constituting a thin cyst or envelope; yet, in rare instances, the black matter has been found external to, or upon, the free serous surface, enclosed in a loose, spongy tissue, or serous covering of considerable tenacity, but of great tenuity.

7. *C*. *Stratiform melanosis* occurs only in serous membranes. The black matter either may only paint or stain the serous surface, or it may form an almost distinct layer on this surface. In the latter case, the consistence of the black matter is that of very firm jelly, or somewhat greater. It seems to be deposited in a very fine, transparent, soft, spongy tissue, like that enclosing the melanoid matter in the serous melanotic tumours just described. This form of melanosis is not often met with in man; but to a much greater extent in the horse.

8. *D*. *Liquiform melanosis* is chiefly formed in natural or morbid cavities. It is occasionally secreted or exuded in these situations, or effused during the softening process of melanotic tumours. It is very rarely met with in man. It has been observed in the serous cysts formed in the ovaries, and the capsules of the ova which have escaped from these organs.

9. To these four forms of melanosis, which has been minutely described by Dr. CARSWELL, a fifth has been added by Dr. NOAK, which he denominates *melanosis aperta*, vel *ulcerosa*; and Dr. SAVENKO has proposed another, which he describes as *carcinomatous*. The former is more frequently met with in the horse than in man, and is merely a consequence of certain changes produced in the tissues by the matter deposited, that will be hereafter noticed; the latter is only the association of carcinoma with melanosis.

10. *E*. One or more of these forms may coexist, and either may exist singly. The tuberiform deposit is the most common and conspicuous of all the forms melanosis assumes. The disease is never confined to one tissue or organ only; but is found to pervade a greater or less number of these either simultaneously or successively. It may be almost equally extensive in all parts which it invades, or it may be abundant in one situation and scanty in another. It may be even so extensive as to render the natural structure of the part imperceptible.

11. iii. THE ANATOMICAL RELATIONS OF MELANOSIS. — The texture and form of the part in which the melanotic matter is deposited determine in a great measure the *consistence* which this deposit assumes. There is every reason to infer, that the black matter is deposited in a more or less fluid state, particularly in cellular and adipose tissues; and that it acquires additional consistency by the absorption or imbibition of its more liquid parts. Thus deposited in a fluid state in the areolæ of the tissue, it will necessarily assume various forms according to the nature of the tissue or compound structure, to the rapidity with which

the deposit takes place, and to the abundance of the matter deposited. Viewing it in this light, as well as by the aid of microscopic observation, it may be inferred that the melanotic matter is *unorganised* — is merely an extravascular deposit or exudation into the areolæ either of natural structures or of morbid formations, or of both. In many cases it may even be washed away, leaving the cellular filaments or areolæ which contained it porous, spongy, and reticulated. Whatever vessels, therefore, which may be traced into melanotic tumours, belong to the structure of the part, and not to the melanoid matter itself; and when the melanoid matter is associated with morbid or new productions, the vascularity is that of these productions, and not of the matter deposited in or colouring them; no bloodvessels being traced *into* the black matter itself.

12. iv. PHYSICAL AND CHEMICAL CONSTITUTION. — The black matter itself is without any marked odour or taste. It is opaque, miscible with water or alcohol. It putrifies slowly when exposed to the air or kept in water. The stain it imparts to the hand, or to linen, is readily washed out. It has been analysed by LASSAIGNE, BARRUEL, HECHT, and HENRY; and the results of all the analyses are, that melanosis is essentially composed of the colouring matter of the blood and fatty substance. M. FOY considers that it is the colouring matter of the blood highly carbonised; and this is very probably the truth.

13. v. PROGRESS. — The progress of the disease evinces certain changes. 1st, in the melanotic deposit; and, 2d, in the structures in which it is lodged. — *A.* As respects *the changes in the melanoid deposit;* these consist *firstly* of inspissation or solidification from the absorption of the more watery part of the deposit; and, *secondly*, of the softening or liquefaction which consecutively takes place. — *a.* The *inspissation* of the matter may be slow or imperfect, as when the matter is still contained in the capillary vessels; or it may be more rapid and complete, as when it is exuded into, or combines with, the molecular structure of a dense organ. When formed in an adventitious cellular or serous tissue, or other morbid production, the changes in it, especially its inspissation, depend upon the density of the production which it infiltrates, its density resisting the diffusion of the exuded matter.

14. *b.* After solidification has been carried as far as the circumstances of the parts permit, *softening* takes place. This change is manifestly brought about by the size, situation, and anatomical relations of the morbid deposit. These occasion — 1st, an irritation in the part, and the effusion of serum in and around it.; 2d, the extinction of the vital cohesion of the tissues in which the black matter is deposited.

15. *B.* The *changes in the structures in which melanotic matter is contained* are readily inferred from what has been just stated. The irritation of the deposited matter acting upon the living tissues as a foreign and dead body, induces further changes. When the deposited matter forms a tumour, compression of the surrounding tissues is then added to irritation; the latter state, by encreasing effusion, sometimes augmenting the former, until ulceration and destruction of parts take place. The irritation produces serous effusion, softening of the containing and surrounding tissues, disorganisation with or without suppuration, and ultimately open ulceration. The melanotic ulcer thus formed is either regular or irregular; its edges are thin, soft, pale, or slightly red, or tinged with black, bevelled from within outwards; and it exudes a black fluid. If the margins of the ulcer are the seat of chronic inflammation, they become thickened, infiltrated, or projecting and hardened; sometimes they are everted, and the internal surface presents a number of excrescences. When cut through they are of a pale grey colour, and closely resemble scirrhus. Melanotic ulceration is comparatively rare, and as yet imperfectly observed.

16. vi. SYMPTOMS AND DIAGNOSIS. — The symptoms of melanosis are seldom well marked at the commencement, unless the morbid deposition occurs in parts which come directly before our senses; and it is generally not until after death that we are at all enabled to ascertain its existence. As far as the symptoms have been recorded, and as far as I have observed them in a single case which has come before me in the human subject, melanosis is chiefly characterised during the life of the patient by a gradual sinking of the vital energies, a cachectic habit of body, a dusky or ash-coloured countenance, and a marked change of the nutritive functions, giving rise to great emaciation, dropsy, a partial œdema of the cellular tissue, sometimes to effusion into the serous cavities, to a weak, quick, and small pulse, with night perspirations towards the termination of the disease; and, occasionally, when the lungs are affected, to a blackened mucous expectoration.

17. It is generally observed, that however important or necessary to the continuance of life the organ affected by this malady may be, febrile excitement never manifests itself in an active or marked form — a circumstance serving, in the opinion of LAENNEC and LOBSTEIN, to distinguish during life the consumption depending upon melanosis from that proceeding from tubercles in the lungs. But this is an insufficient source of diagnosis; for phthisis may exist without any febrile symptom beyond rapidity of pulse and perspirations. These symptoms also characterise the last stages of melanosis, but they are unattended by purulent expectoration and the stethoscopic signs of ulcerated cavities in the lungs, which are generally present in the last stage of phthisis. Melanosis does not appear to give rise to much pain. The presence of black matters in the discharges from the stomach or bowels is no evidence of the existence of melanosis, as such matters generally proceed from very different sources from this, as shown in the article MELÆNA.

18. vii. REMOTE CAUSES. — Melanosis has been met with in all periods of life, but most frequently in old age. It is not confined to the human species, but has been observed in the horse, the dog, the cat, rabbit, &c., but most frequently in the horse; and particularly those which are grey or white. As to its exciting causes, the infrequency of the disease prevents me from stating any thing with certainty. It seems, however, probable, that it is occasioned by whatever lowers the vital energies, and impedes the functions of the respiratory and biliary organs, or the decarbonising actions of the frame.

19. viii. OF THE ORIGIN AND NATURE OF THIS SUBSTANCE different opinions have been entertained. The most plausible of these refer it to an

altered state of the colouring part of the blood, arising from the presence of an extraordinary quantity of carbon; and infer that the melanoid matter is in its composition nearly allied to adipose substance, particularly as regards the quantity of carbon composing it. This seems to be the opinion of Heusinger and Gohier, who refer in support of it to the large proportion of the phosphate of iron and carbonaceous matter found in this substance upon calcination. Laennec considered it as a distinct species of cancer. He was evidently led to the adoption of this opinion by the circumstance of both diseases occurring in nearly similar states of the vital energies of the frame, and in analogous conditions of the soft solids — an evident cachexia, or contamination of the frame, apparently existing in both. Besides, the frequent association of this disease with schirrus and carcinoma seemed to favour this notion. But this can only be viewed as an occasional complication, as melanosis is also found associated with tubercles and other morbid productions. Moreover, the parts affected by this disease often present no signs of change beyond the infiltration of black matter; and cancerous disease is seldom so generally diffused through the various tissues and organs as melanosis is.

20. Chemical analysis has confirmed the opinions of Gohier and Heusinger, and shown that this matter offers some analogy to the colouring matter and fibrine of the blood. MM. Breschet, Cruveilhier, Carswell, and Lauth have, moreover, found it in the blood-vessels which have remained undestroyed in softened melanoid tumours. M. Treviranus, in experiments made by him on frogs, observed that, when the blood-vessels were deprived of the nervous influence, a black matter resembling the pigmentum of the choroid was formed in the capillaries and in several membranes. From this it may be inferred, that the black matter thus formed proceeded from the deposition of the carbonaceous particles, which, not having combined with oxygen, had not been eliminated from the blood in the form of carbonic acid, owing to deficient vital and nervous power, and to the enfeebled and retarded circulation in the capillary vessels.

21. I am therefore of opinion, that the melanoid matter is produced or secreted from the blood, owing to an enfeebled state of the vital influence of the system generally, and the capillary vessels in particular; that this state of the vital influence is insufficient for the accomplishment of the healthy changes induced in the capillaries of a part, or of the body generally; and that free carbon accumulates in these vessels, which, under the defective vital energy of the system, and diminished tone of the extreme vessels, is deposited with other constituents of the blood, 1st, in tissues not previously changed in structure; — 2d, in parts the texture of which have been variously changed; and, 3d, in new formations, as false membranes, carcinomatous growths, and other malignant productions.

22. ix. Treatment.—The great difficulty of ascertaining the existence of the disease previous to death, has prevented the employment of those means which might have been tried if its presence had been evinced. Upon this subject, therefore, medical literature is perfectly barren. In the uncertainty under which the physician is compelled to act in all cases of this description, the general conditions of the frame, and external manifestations of depressed vital energies, will be the chief circumstances on which he can found his indications of cure. His attention will therefore be chiefly directed to those means which are found most energetic in rousing the powers of life, imparting tone to the minute capillaries, and promoting the functions of the various assimilating and secreting viscera and emunctories of the frame. With this view, I can only suggest the employment of quinine with the mineral acids, or with camphor, and alternated with purgatives or aperients — the iodide of potassium and the liquor potassæ with compound decoction of sarsaparilla — the muriatic or chloric, or nitro-hydrochloric acids— the chlorate of potash, the chlorides; &c. In order to excite the decarbonising functions of the liver, whilst restoratives are being prescribed, chologogue purgatives should also be given occasionally. The patient should live in a pure, dry atmosphere, and take due exercise in the open air.

23. II. Spurious Melanosis. — Those states of parts, or of disease, that resemble true melanosis, have been fully described by Dr. Carswell. This spurious disease is caused, 1st, by the introduction of carbonaceous matter; — 2d, by the action of chemical agents, and by the stagnation of the blood in the capillaries. — *A. Spurious melanosis from the introduction of carbonaceous matter.* — The inhalation of the carbonaceous matter proceeding from common combustion was first supposed by Pearson to discolour the *pulmonary tissue.* Laennec afterwards entertained the same opinion; but the fact was not fully demonstrated until Dr. S. C. Gregory published a remarkable case which came under his care. This form of spurious melanosis occurs only in the Lungs, and is described in the article on the pathology of these organs (§ 185.).

24. *B. The action of chemical agents on the blood* gives rise to a form of spurious melanosis. In cases of chemical dissolution or digestion of the parietes of the stomach after death by the acid contained in the gastric juices, and in cases of poisoning by acids, the blood contained in the capillary vessels of the digestive tube, as well as that which is extravasated, frequently presents a blackish tint, so as to simulate melanosis of the part. The action of sulphuretted hydrogen gas may also give the blood in the capillaries of the intestines, and that effused in the same situation, a black colour. It is chiefly, however, in a forensic point of view that this subject becomes important.

25. *C. The stagnation of the blood in the capillaries* from loss of vital power, and independently of the action of acids, or of other chemical agents, sometimes imparts a melanotic appearance to certain tissues. This occurs chiefly in the digestive mucous surface, and in the lungs. In the former situation, it is not infrequently observed after death from pestilential cholera; in the latter organ, it occurs both in that malady, and in the more sudden forms of congestion, sometimes supervening upon organic changes in the substance of that organ, and in the bronchi.

Bibliog. and Refer. — *Laennec*, Bulletins de la Soc. de l'Ecole de Médecine, No. 2. 1806. — *Pearson*, in Philosoph. Transact. 1813, p. 2. — *Gohier*, Mém. et Observat. sur la Chirurg. et la Méd. Vétérinaire, t. i. Lyon, 1813. — *Breschet*, Journ. de Physiolog. Experimentale, vol. i. art. 4. Oct. 1821. — *Merat*, Dict. des Sciences Médicales, t. xxxii. art. *Melanose.* — *C. F. Heusinger*, Untersuchungen über die Anomale Kohlen, und Pigmentbildung. Eisen. 1823, p. 95.; and Archives Génér. de Med. t. v. — *Andral*, Dict. de Med. t. xiv. p. 99.; et Précis d'Anatomie Pathologique, t. i. p. 446. — *Reissessen*, Preisschrift über den Bau der Lungen, p. 46. — *Cullen* and *Carswell*, in Med. and Chirurg. Transact. of Edin. vol. i. p. 264. — *T. Fawdington*, A Case of Melanosis, 8vo. Lond. 1826. — *Crampton*, Dublin Med. Trans. vol. i. n. s. 1830. — *C. A. Noak*, De Melanosi cum in Hominibus tum in Æquis Obveniente, 4to. fig. Lips. 1829. — *P. Savenko*, Tentamen Patholog. Anatom. de Melanosi. Petrop. 1825. — *Lobstein*, Traité d'Anatom. Pathologique, t. i. p. 460. — *Hooper*, The Morbid Anatomy of the Human Brain, pl. xii. fig. 2. and 3. — *R. Carswell*, Pathological Anatomy, fasc. iv. Lond. 1834; and Cyclop. of Pract. Med. vol. iii. p. 85. — *J. Hope*, Morbid Anatomy, &c. 8vo. Lond. 1833, p. ii. — *D. Williams*, Transact. of Provincial Medical Association, 8vo. vol. i. 1833.—*Cruveilhier*, Anat. Patholog. livr. xix. pl. 3. and 4. — *J. Vogel*, Icones Histologiæ Pathologicæ, 4to. Leips. 1843. p. 121.

MEMBRANES — Pathology of. — The reader will find the *diseases* and *lesions of membranous tissues* fully discussed in the articles Brain, Bronchi, Digestive Canal, Peritoneum, and Pleura.

MENINGITIS. — See Brain (§ 3. *et seq.*).

MENORRHAGIA. — See Hæmorrhage from the Uterus (§ 220.); *and more especially* Menstruation.

MENSES, MENSTRUATION. — Synon. *Catamenia* (from κατα and μην); Καταμηνια; γυναικεια, Gr. — *Menstrua, menstruæ purgationes; Menstrui Cursus, profluvium mulierum,* Auct. — *Frauenzeit, Monatzeit, Monatliche reinigung,* Germ. — *Les Règles, les Menstrues, Menstruation,* Fr. — *Mestrui, Corso Mestruale,* Ital. — *The Menstrual Flux, the Courses, the Monthly Discharge, the Monthly Period, the Flowers, the Catamenia, the Monthly Indisposition.*

Classif: — General and Special Pathology. — Therapeutics.

1. The consideration of the derangements to which menstruation is liable comprises that of the chief functional disorders of the uterine system; and in all the disorders and structural diseases of this system, the states of menstruation are the most important phenomena, enabling us not only to form correct ideas as to their natures, but also to devise appropriate and successful indications of cure.

2. The derangements of menstruation have been variously *classed* and considered by systematic writers, as well as by those authors who have confined their researches to the diseases of the female œconomy. In the works of the latter, to which we are especially entitled to look for a full and comprehensive detail of these derangements, the principal only of them are discussed; and others, which are often of great importance in their local and constitutional relations, are altogether overlooked. Denman, Burns, Hamilton, Capuron, Nauche, Dewees, Boivin, Dugés, and Churchill confine themselves to the consideration of the three states of disorder usually designated by nosologists, *amenorrhœa, dysmenorrhœa,* and *menorrhagia.* Others have noticed, in addition to these, other derangements; but very few writers have embraced the whole of them. Carus has judiciously noticed premature, delayed, and incomplete menstruation. Dr. Blundell has comprised offensive catamenia. Joërg and Mende have not overlooked menstruation repeated too frequently, nor that which occurs not often enough or only at prolonged periods. Siebold arranges the subject into the precocious and tardy developement of the menses — excessive and scanty discharge — suppression of it — painful menstruation — and vicarious menstruation. Dr. Power adopted a classification, which might have comprised all the disorders to which this function is liable; viz. — *a.* Deficiency of the menstrual actions. — *b.* Excess of the menstrual actions. — *c.* Irregularity of the menstrual actions. The adoption of any arrangement is of no further importance than as it may the best enable us to comprise all the useful and practical considerations of the subject, in such due order and relation to each other as may be made most applicable in practice, and most advantageous in advancing our knowledge of uterine disorders, and of their relations to other affections and maladies.

3. In discussing the subject of menstruation, I shall consider, *first,* the phenomena and management of this function; and afterwards, the various disorders and irregularities to which it is liable; and, briefly, the connection of these disorders with other affections and diseases; or, more definitely, as follows: — i. The phenomena of menstruation. ii. The management of the menstrual periods in various circumstances. iii. Absent, suspended, and suppressed menstruation; comprising vicarious menstruation. iv. Painful and difficult menstruation. v. Excessive menstruation; and vi. Various irregularities of this function not comprised under the foregoing heads. The *first* and *second* of these comprise *the physiological and hygeienic consideration of the subject;* the others, *the pathological and therapeutical discussion of it.*

4. I. The Phenomena of Menstruation. — It is not intended that all the phenomena of menstruation and female puberty should be here noticed, but only those more especially connected with the disorders of menstruation and of the female œconomy. The period of commencing and of established puberty in the female has generally been viewed in connection with the occurrence of menstruation. The relation generally exists; but not infrequently we observe this function to appear, either in a regular or irregular manner, before the other indications of puberty are fully developed; and as frequently, these indications precede, for a longer or shorter period, the establishment of the catamenial flux. Much of this variability in the accession of the several phenomena of puberty depends upon the circumstances of modern society and education, which will be shown hereafter to be so remarkably productive of the disorders of menstruation.

5. Up to the period of menstruation, the ovaria and uterus merely exhibit the state of simple growth with the rest of the œconomy; but at this period they become more fully developed, and the uterus manifests the higher vital manifestations of irritability and secretion. During these local changes, the whole frame, and the mental manifestations, present greater activity of developement. The nervous system betrays encreased susceptibility and sensibility; the mind acquires extended powers of emotion and passion, and the imagination becomes more lively. The mammæ and pelvic viscera are rapidly developed; the hips and thighs enlarge; the ovaria become red and swollen; the Fallopian tubes, with their fimbriæ,

as Dr. Ferguson remarks, are elongated, erectile, and irritable; the uterus has acquired bulk, and a more sanguine hue; the organs of the thorax participate in the effects of that action, which is encreasing the mammæ, so that the lungs, the larynx, and even the arms acquire the contours of a maturer developement. The intensity of vitality, and the resistance of the frame to hurtful agents, are such at this period, that the mortality is less at this than at any other epoch.

6. If, on the other hand, the uterine organs continue undeveloped, and the menstrual discharge does not appear, the growth of the body is impaired, and the general character and appearance of it unhealthy, languid, blighted, and imperfectly formed. The mind is dull, weak, or depressed. The emotions and passions are imperfect, or altogether absent. The vegetative functions are less vigorous; and fat and cellular substance are formed instead of muscular tissue; the mammæ and lungs are insufficiently developed; and not only is life less intense, but it is of much shorter duration, early phthisis terminating a state of sickly and imperfect existence.

7. Much discussion has recently taken place respecting *the period at which the menses first make their appearance;* and considerable misapprehension has existed on the subject; inasmuch as this flux, when occurring very early, is not always, nor yet so generally attended as has been supposed, with other signs of developed or even of advancing puberty. I have seen in public and private practice numerous cases of very early menstruation, the flux occurring regularly for months. In one case brought to the infirmary for children, it was as early as the sixth year. I have seen several in whom the catamenia appeared as early as the tenth and eleventh years in this climate, and many in warm countries; but in most of these, this flux was the chief indication of commencing puberty. The accession of menstruation has been supposed to be much earlier in warm, than in temperate and cold climates; but this opinion has been disputed by Mr. Roberton and others. Having paid some attention to this subject many years ago, I had come to the conclusion, from inquiries made when travelling both in hot and in cold countries, that a considerable difference as to the age actually exists, although that difference is not so great as most physiological and other writers have stated it to be; and I am convinced that it is partly owing to the difference in the constitution of the several dark and white races of the species — that it is as much owing to this cause as to climate.

8. Besides climate, there are manifestly other circumstances, which, in certain constitutions, cause an early or premature appearance of the catamenia; and which, perhaps, in other or opposite constitutions and temperaments, tend to delay or to suppress altogether this discharge, by weakening or exhausting the undeveloped sexual organs. A number of female children sleeping in the same apartment; the intercourse of the sexes at an early age, as in manufacturing towns and cities; the temperature and circumstances in which young females are placed in cotton and numerous other factories; the excitements to which the mind is exposed in these, and in schools, &c., are, in temperate climates, the chief causes of the premature or early occurrence of menstruation, and of the subsequent irregularities of this function. The influences which are in operation in large manufacturing localities, often place young females in similar physical and moral conditions to those of the dark races in warm climates, and hence the difference of the period at which menstruation commences in both is often not very great.

9. The following table will show the years in which 1604 females experienced the accession of the catamenia.

Years.	272	68	160	432	85	450	137	Total, 1604.
	Reported by M. Petrequin.	At Marseilles and Toulon.	By M. Buchacourt at Lyons.	At Lyons.	At Paris.	At Manchester.	At Goettingen.	
9	—	—	—	—	1	—	—	1
10	4	—	1	5	—	—	—	10
11	10	6	4	14	3	10	—	47
12	15	10	11	26	14	19	3	98
13	33	13	14	47	6	53	8	174
14	33	9	17	50	18	85	21	233
15	45	16	31	76	54	97	32	351
16	48	8	31	79	7	76	24	273
17	32	4	26	58	6	57	11	194
18	27	2	11	38	5	26	18	127
19	12	—	9	21	8	27	10	87
20	8	—	2	9	3	4	8	34
21	4	—	—	5	—	—	—	9
22	1	—	1	1	—	—	2	5
23	—	—	—	—	—	—	—	—
24	—	3	2	—	—	—	—	5

10. From the foregoing table it will be seen that menstruation generally commences between the ages of twelve and nineteen, and more frequently at the age of fifteen, than at any other age. Although it is not always at its commencement correlative with other signs of puberty, still it must be viewed as generally connected with, and depending upon, the changes taking place in the ovaria and uterus at this period, and as being determined by the encreased developement and activity of the nervous system of organic life endowing the uterine system. That the ovaries exert an influence in determining the occurrence of menstruation was supposed by Friend and many more recent writers, and is not improbable. The well-known case published by Mr. Pott, and cases of disease of the ovaria which have occurred to Dr. Montgomery and in my own practice (see the case about to be alluded to), almost demonstrate this influence. Dr. Power attributed menstruation to the action of the ovaries. He conceived, that gestation is the natural condition of the female organs; that a female menstruates because she does not conceive; that certain changes take place in the ovarian vesicles preparatory to the transmission of the ovum, and that parallel changes are taking place in the uterus which may issue in the formation of the decidua; but that, if the stimulus of impregnation be denied, the encreased action of the uterus is not sufficient to produce that effect, although it is sufficient to cause the effusion of a fluid, which is the menstrual fluid. However this may be, there can be no doubt that the accession of the catamenia is the consequence of a periodical excitement, or irritation of the nerves of the uterine

organs acting upon the vascular system of these organs, and determining an encreased afflux of blood to them; and hence, that it is somewhat analogous to the condition in the lower animals usually denominated that of "heat." An opportunity was afforded to Dr. Hooper of examining the organs of a female who was instantaneously killed by accident during the menstrual period. The uterus was swollen and vascular; its structure less dense than usual, and its internal membrane injected, floccy, and bedewed with menstrual fluid. The ovaries and Fallopian tubes were also swollen and very vascular. Other facts and considerations might be adduced to prove that menstruation is the result of encreased nervous and vascular activity of the uterine organs; and this view is that most accordant with the phenomena which this function evinces during disease.

11. The *symptoms indicating the first accession of the catamenia* are not always present or constant; but, generally, for some days previous to the accession of the discharge, headache, heaviness, languor, pains in the back, loins, and down the thighs, are complained of, with indisposition to exertion. There is a peculiar dark tint of the countenance, particularly under the eyes; and occasionally uneasiness or a sense of constriction in the throat, or about the thyroid gland. The cutaneous perspiration has often a faint or sickly odour, and the smell of the breath is peculiar. The mammæ are enlarged and painful, or tender. The appetite is fastidious and capricious, and digestion impaired. These symptoms continue one, two, or three days; and subside as the menses appear. At the commencement of this function, the second, third, or even the fourth period may not be attended by any discharge; it sometimes thus recurring irregularly at first, even in healthy females. The period continues from three to six days, and returns every twenty-eight days, excepting during gestation and lactation.

12. In order that this function should be duly established and sustained, the following conditions are requisite: — 1st. A healthy developement of the female organs of generation. — 2d. A certain degree of vigour or organic energy of these organs. — 3d. The absence of such lesions as impair the influence of the ovaries, or interrupt the functions of the uterus. — 4th. A certain degree of constitutional power. Upon these the healthy or regular state of the menstrual discharge chiefly depends.

13. The *duration* of the function of menstruation is very generally thirty years, but more frequently above than under this term. The periods of commencement have been shown above. Those at which the function ceases have been commonly stated at an earlier age than is generally observed in this country. Menstruation has been said to cease at about the forty-fifth year; but, judging from my own inquiries, I believe that the period between forty-five and fifty is the common period with healthy females. In warm climates this function may cease between thirty-nine and forty-five years; but in temperate climates it disappears more frequently after than before the forty-fifth year — at least in England. Mr. Roberton states, that of seventy-seven females, ten ceased to menstruate at forty-eight years; seven at forty-nine; twenty-six at fifty; two at fifty-one; and seven at fifty-two; the catamenia thus disappearing, in fifty-five out of seventy-seven, from the years forty-eight to fifty-two inclusive.

14. II. Management of the Menstrual Period. — i. *During the presence of the catamenia*, the female frame betrays encreased susceptibility and excitability; and this period is usually viewed by females themselves as one of greater delicacy and liability to be affected by injurious agents and mental emotions. It is of much importance to obtain satisfactory information as to the regularity and states of this evacuation in all cases in which the health and disorders of females are concerned; and therefore the inquiries of the physician respecting it should be careful and precise. — *a.* When the *female enjoys good health*, and the discharge is regular and natural in every respect, all that is required, during its continuance, is the avoidance of all influences, physical and moral, which may powerfully affect the body and mind. These may either suppress, interrupt, or encrease the discharge, and either contemporaneously or consecutively produce other very serious or even dangerous results. Sudden frights, fits of anger, and all powerful mental emotions may have an injurious effect upon this discharge. Bloodletting, emetics, purgatives, emmenagogues, active diuretics, the more powerful diffusive stimulants, and astringents ought not to be resorted to at this period, as they may morbidly encrease the discharge, or even altogether arrest it. Cold or warm bathing, hip and foot baths should also be discontinued during this period, especially when it is healthy or natural. Care ought also to be taken not to expose the feet to wet or cold; and to avoid sitting upon stone, cold, or damp seats, or upon the ground. Excessive exertion of every kind; long walks, long rides on horseback, or on rough roads, and prolonged dancing or standing ought also to be avoided, as tending to produce not merely an encreased discharge, but even prolapsus uteri, particularly in married females. Females subject to leucorrhœa ought not to have recourse to vaginal injections during or shortly before this period. Dr. Locock remarks, that either "by accident or by criminal impatience, sexual intercourse has sometimes been permitted during this period; and, although not constantly, yet such conduct has been frequently followed by the most serious effects — generally by profuse hæmorrhage; at other times by a sudden suppression of the discharge; to which have succeeded fever, delirium, obstinate hysteria, confirmed mania, and even catalepsy."

15. ii. On *the first appearance of the menstrual period* there is generally little further required as respects the healthy young female, than great care in avoiding the injurious physical and moral influences now mentioned; and even when the second, third, or fourth periods for the recurrence of the discharge are passed over, but little may be necessary if no further disorder be manifest. If, however, the female be delicate, or is much confined in-doors, or if the bowels be habitually costive, the preparations of iron or of iodine, with emmenagogue purgatives, as aloes with myrrh, &c., may be administered, and regular exercise in the open air enjoined. A smart walk should be taken daily before breakfast, and be repeated twice in the course of the day. Confinement to

close or crowded apartments, and in close or crowded streets; and, still more, numbers sleeping in small, low, damp, crowded or ill-ventilated rooms; and deprivation of air and exercise — of the free use of the limbs in an open and healthy atmosphere, are the chief causes of the disorders of menstruation in cities and large or manufacturing towns. To these causes may be added want of sufficient sleep, prolonged mental attention and exertion, and whatever tends to impede the functions of respiration, digestion, assimilation, and muscular action. Hence all these injurious agents ought to be especially avoided at the epoch of female puberty.

16. iii. The *period of the final cessation of the menses is variable;* and even in healthy females the change may be attended by phenomena requiring discrimination on the part of the physician. This period is also one which often excites the fears of females. In a few cases, the uterine functions acquire an encreased activity shortly before their final cessation, so that females, who have not had children for years, or who have been barren hitherto, have unexpectedly become pregnant. More frequently, however, females mistake the symptoms often attending the cessation of the menses, for those of pregnancy. The passing over of the menstrual period, swelling and pain of the breasts, the sickness and disorder of the stomach and capricious state of the appetite, the increase in size, and the movements occasioned by flatulence of the bowels, often accompanying this epoch, sometimes induce a belief in the mind of even an experienced female that she is pregnant; and her exact state can be determined only by an examination per vaginam, by time, or by the exhibition of purgatives and carminatives.

17. Menstruation rarely ceases at once when the usual age at which it disappears is arrived at, unless some accidental circumstance, as fright, exposure to cold, an acute illness, &c., occurs and occasions it. More commonly the change is gradual, and is attended by irregularities, as to the intervals between the periods, the duration of the period, and the abundance or scantiness of the evacuation. Sometimes the discharge returns every two weeks, then ceases for several weeks, or even months, and afterwards recurs for a few periods as regularly as ever, and then altogether ceases. Many females of delicate constitution, who have complained much during the earlier epochs of their existence, or who, up to the period of this change, have been liable to hysterical or nervous ailments, have subsequently enjoyed a much better state of health, and lived long and healthily, when this change has been brought about carefully and fortunately. During the functional activity of the uterine organs, and whilst these organs are highly susceptible of irritation, many of the disorders depending upon irritation of them are more or less frequently experienced; but when these organs undergo the change characterising this epoch of life, the susceptibility of irritation subsides, and gradually disappears; and, consequently, the disorders which thus originate are no longer felt.

18. On the other hand, when disease already exists in some organ, or even when a predisposition to disease exists, the cessation of the menses generally aids in aggravating the former, or in developing the latter. A disorder, or even an organic lesion, which may have been so slight, or so little advanced, as to escape detection as long as the menstrual discharge has continued, and has proved a periodical derivation from the affected organ, and a recurring evacuation of the vascular system, will no longer thus remain latent, or continue stationary, but will assume an active and rapid form. The maladies which most commonly become thus developed are the various organic and malignant diseases of the uterus and mamma; gout, apoplexy, and paralysis; organic diseases of the liver; dropsies; structural changes of the lungs; cutaneous eruptions; ulcers of the lower extremities; hæmorrhoidal affections; epilepsy, hysteria, and mental disorder, &c. In many cases leucorrhœa occurs, and continues long at this epoch, and powerfully tends to prevent the vascular fulness which might develope or aggravate these or other diseases. In some instances, hæmorrhoids supervene, and have the same effect; and even the appearance of cutaneous eruptions, or ulcers on the extremities, exert some degree of derivation from an organ disposed to serious disease.

19. iv. *The medical management of impending disease at this epoch* is of great importance, and the earliest indications of disorders should be carefully watched, and duly estimated. Signs of vascular fulness, of local congestions, and of oppression of any organ, ought to be met with local depletions, which should be repeated according to the circumstances or urgency of particular cases. Vascular fulness, or visceral oppletion or obstruction, are the chief pathological conditions at this period of life; and, although local bleedings are necessary to remove impending mischief, still diet and regimen are the means on which we should chiefly depend for the permament removal of the evil. A regular state of the bowels; the occasional exhibition of a mercurial to promote the biliary secretion; a light, farinaceous, and vegetable diet, or a very moderate use of animal food; and regular exercise in the open air, are means which are applicable to all cases characterised by vascular fulness or congestions. When disease of some internal organ is actually present, and when the more acute or active state has been subdued by vascular depletions, and other appropriate means, perpetual blisters, setons, and issues will prove of service in removing the remaining irritation, and in preventing a recurrence of vascular determination to, or congestion of, the affected organ.

20. In all cases, the treatment should mainly depend upon the states of the vascular system, in connection with those of the chief viscera; nevertheless, the nervous manifestations require attention. If the nervous system be morbidly susceptible, or sensitive, the vascular system being neither too full nor oppressed, means should be used to impart energy to it, and thereby, as well as by other agents, to remove this condition. If it be connected, as is sometimes the case, with a deficiency of blood, or of hæmatozine, the ferrugineous tonics should be prescribed; and if painful or convulsive disorders be associated with this state of the vascular system, narcotics, anodynes, and antispasmodics may be conjoined with these. In most cases of sudden seizure attended by convulsions — whether epileptic or hysterical — al-

though following the cessation of the menses, anti-spasmodics and anodynes constitute a principal part of the treatment; and even local depletions should be cautiously and sparingly employed, unless the signs of general or local fulness be quite conclusive, and then they ought to be resorted to in conjunction with the remedies just mentioned.

III. Absent, Suspended or Suppressed, and Vicarious Menstruation. — Synon. — *Amenorrhœa* (from *α*, priv., *μηνες*, the menses, and *ῥεω*, I flow), Vogel, Cullen, Parr, Young, Pinel, &c.; *Emansio mensium, retensio mensium*, Auct.; *Paramenia obstructionis*, Good; *Ischomenia*, Swediaur; *Meneschesis*, Ploucquet; *Defectus menstruorum, suppressio mensium*, Auct. var.; *Manque des règles, suppression de règles*, Fr.; *Mangel des monatblutfluss*, Germ.; *Suppressione dei menstrui, amenorea*, Ital.; *Obstruction*.

Classif. — IV. Class. V. Order (*Cullen*). V. Class, I. Order (*Good*). — I. Class. II. Order (*Author*).

21. Defin. — *Absence of the menstrual discharge at the period of life when it is usually regularly established, or the suspension or suppression of it after it had recurred regularly for some time.*

22. This subject may be considered under three distinct heads. — 1st. Absence and retention of the menses. — 2d. Suppression of the menses; and — 3d. The complication or association of either of these with some other disorder or malady.

i. Absent and Retained Menses. — Synon. — *Emansio mensium; retentio mensium; delayed menstruation; retained menses; obstructed menstruation.*

23. Defin. — *A delay in the first appearance of the menses, owing to functional disorder or to organic change.*

24. The menstrual discharge may be delayed or absent, owing to *functional inactivity or disorder*; or it may be *obstructed or retained by organic change.* Hence, amenorrhœa presents *two forms*, the distinction between which should be preserved — the one being *simple and functional*, the other *structural and obstructive.*

25. *A.* Simple or Functional Amenorrhœa. — *Emansio mensium; delayed menstruation.* — The differences in the age at which menstruation commences have already been noticed. In some of those instances in which it has not appeared until three or four or more years after the usual period, in which it has been *delayed merely*, the amenorrhœa being simple, or uncomplicated with organic change or mechanical obstruction, it will be found that the retardation has occurred in one or other of the following states: — *a.* The developement and action of the uterine system are not correlative with the growth and health of the body. *b.* The developement of both the uterine organs and the whole frame is apparently natural. *c.* The uterine functions are insufficient to produce a coloured discharge, uterine leucorrhœa being substituted. — *a.* Some of the cases of simple amenorrhœa are actually instances of protracted puberty, the whole frame betraying imperfect growth; but care should be taken to ascertain the nature of the case, and the absence or presence of malformation or obstruction of the kind about to be noticed (§ 39.). Siebold and Churchill distinguish two principal conditions of the system in this form of amenorrhœa, viz. a plethoric state conjoined with rigidity of fibre and robust health; and somewhat of deficiency of blood, or laxity of fibre, associated with pallor, and a weak or delicate constitution. In both, an apparent attempt at menstruation occurs occasionally, or even monthly; and is characterised by pains in the back and loins; by weight in the lower part of the abdomen; by aching in the tops of the thighs, with lassitude and uneasiness; and sometimes by constriction about the thyroid gland. After two or three days these symptoms cease, without any menstrual evacuation, or merely with leucorrhœal discharge; and are often succeeded by severe headaches, with intolerance of light and sound. In the more plethoric cases, these sufferings are severe, and occur occasionally between the efforts at menstruation, and are attended by flushings and throbbings of the face and head; quick, full pulse, thirst, and general febrile action. In the pale and delicate, there is little or no fever, and the symptoms are slighter and more chronic. As these disorders continue or occur, the functions of the digestive organs languish; the bowels become irregular; the countenance pale; the strength reduced; and the breathing short; and the general health gradually declines. Various hysterical symptoms, or even severe hysterical paroxysms, particularly in the more plethoric cases, occasionally appear; and severe attacks of disease of vital organs are apt to occur, from the influence even of their less energetic exciting causes. Nauche met with two instances of fatal disease of the brain in this state of menstrual obstruction. I have seen a similar instance, attended by epileptic convulsions, and terminating in fatal coma; also cases of pneumonia, and of congestion of the lungs, in similar circumstances; but most frequently, particularly in the more delicate class of cases, this form of amenorrhœa assumes the complicated state about to be noticed, and the patient passes into chlorosis or into tubercular consumption; or becomes first chlorotic, and subsequently consumptive. In a few cases, however, diarrhœa or some discharge occurs and protects for a time the patient from the more dangerous consequences of the obstruction; or some evacuation takes place, from time to time, which proves vicarious of the menses, as will be noticed in the sequel.

26. Dr. Churchill states that he has repeatedly examined the uterus of patients labouring under amenorrhœa; the cervix uteri has generally been small, and more pointed than usual during the interval; but in all these cases a small-sized bougie could be introduced into the cavity without pain or difficulty. During the abortive efforts at menstrual discharge an enlargement of the cervix takes place, particularly in those cases which are attended at this period with some leucorrhœal discharge.

27. *b.* The *diagnosis* of simple amenorrhœa has reference chiefly to its simple or uncomplicated state. 1st. To the absence of malformation and mechanical obstruction. 2d. To the existence of some other disorder or malady, which may have preceded or caused this condition, or which may be complicated with it. If there be periodical exacerbations (which do not always attend simple

amenorrhœa, but generally that caused by mechanical obstruction), an examination will readily detect the existence of an obstructive cause. When these exacerbations are evinced, and no local impediment exists, the form of the disorder now being discussed may be inferred to exist; and this inference will be confirmed if they be attended by a colourless discharge, or leucorrhœa.

28. *c.* The *prognosis* of this form of amenorrhœa should be stated with caution or reservation in respect of the ultimate result, particularly where it is unattended by periodic efforts (§ 25.), or leucorrhœal discharge during these efforts. The more immediate consequences are those complications presented by the disorder as it becomes prolonged; as chlorosis and disorder of the general health; continued leucorrhœa; sterility, at least during this state of the uterine organs; tubercular consumption, various nervous ailments, anæmia, scrofulous diseases of the glands or joints, organic lesions of the heart, epilepsy, hysteria, &c. The more acute, but rarer consequences of simple amenorrhœa, are inflammations of, or effusions on, the brain and its membranes; hæmorrhagic attacks; inflammations or congestions of the lungs, &c., as noticed above (§ 25.).

29. *d.* The *causes* of amenorrhœa have been generally considered to be indolence, and sedentary lives; gross diet, luxurious habits, hot rooms, soft beds, and too much sleep — causes which may have some influence in producing the complaint in some constitutions, but which are often less influential than others that have been entirely overlooked, more especially sleeping in close and crowded rooms; want of exercise in the open air; constant mental exertion and occupation at the period of approaching puberty, to the neglect of the physical aids of bodily developement; early masturbation and all over-exciting and debilitating and exhausting influences; the vicious system of modern and fashionable education; the occupations of the poorer classes during the period of puberty, especially employments in warm, ill-ventilated, and crowded rooms and factories; insufficient sleep, prolonged exertion and attention, before and during the period of commencing menstruation; residence in cold, damp, and malarial localities, or low cellars; prolonged exposure to cold, and insufficient clothing; nostalgia and depressing mental emotions.

30. *e.* The *pathological conditions* to which amenorrhœa has been attributed are chiefly theoretical — entities of the imagination, such as spasm of the extreme vessels; torpor of the vessels; engorgements of the vessels, &c. The true condition is most probably an imperfect developement, or impaired energy, or both states conjoined, of the uterine organs, arising from causes which impair or exhaust the organic nervous energies during the progress of growth, or from circumstances which determine these energies to the brain. Those cases of simple amenorrhœa which are characterised by vascular plethora furnish no argument against this view; as this state of the vascular system may exist in connection with inactivity of the uterine organs.

31. *f.* Treatment. — It is obvious that the management of amenorrhœa should be based upon the pathological condition of particular cases as far as it is manifested, and be directed with reference to the abortive efforts which may periodically occur. If the obstruction be attended by general vascular fulness and robust health, local or even general bleeding, but chiefly the former, may be prescribed; and preferably at the commencement of, or a day or two before the periodic effort, or recurrence of the leucorrhœal discharge accompanying it. In London and large towns, local bleeding only is required — general bloodletting almost never, or only when the complexion is florid, the habit plethoric, and the fibre rigid. It has been recommended, particularly by obstetric writers, to apply leeches to the vulva in these cases; and to take blood by cupping on the loins. Generally, however, the application of leeches to the insides and tops of the thighs, just below the groins, is to be preferred, both as being more agreeable to young females than the other modes, and as being equally efficacious. Indeed, cupping on the loins is not to be confided in for simple amenorrhœa; and it may even be injurious, although prescribed for inflammatory states of the uterine organs. I have seen it cause suppression of the menses when thus employed.

32. Next to local bloodletting, in the more plethoric cases, *active purging* by means of calomel, aloes, extract of colocynth, &c., with assafœtida, myrrh, &c., is the most efficient remedy; particularly when persisted in for some days before, and even during, the periodic efforts. In the intervals between these, the *emmenagogue purgatives* may be given with the stimulating emmenagogues, or with the biborate of soda; and the patient should live partly, or chiefly, on fish and shell-fish; take regular and active exercise in the open air; and use the hip-bath, especially at the periods adverted to. Having removed vascular fulness by these means, and the catamenia not yet appearing, the treatment may be conducted in many respects as may be appropriately directed for cases characterised by delicacy of constitution, or impaired organic nervous energy, connected with deficiency of blood, or of hæmatosine.

33. For this latter class of patients, the *chalybeate preparations*, particularly the compound steel mixture (Griffith's); the tinctura ferri sesquichloridi, or the vinum ferri with tinctura lyttæ; the carbonate of iron, in the form of electuary, with confection of scammony and confection of black pepper; the compound steel pill with the aloes and myrrh pill; the iodide of iron; the tincture of *iodine*, or the iodide of potassium with tonics; chalybeate mineral waters; the tinctura lyttæ, or tincture of capsicum with tonic infusions; or pills consisting of ox-gall, assafœtida, myrrh, and capsicum, will severally be employed with frequent, although not with constant, advantage. Dr. Locock recommends pills consisting of myrrh, aloes, sulphate of iron, and oil of savine — a combination often prescribed by the celebrated Dr. Gregory.

34. Dr. Bardsley prescribed *strychnine*, commencing with doses of one-twelfth to one-fourth of a grain, twice or thrice a day, that may be slightly increased after a time, or given somewhat more frequently. Headache or twitchings of the muscles require the suspension of it. Nauche also employed it successfully, but gave it in larger doses. The cases, however, in which it was most beneficial were those of suppression of the menses. I have preferred the extract of nux vomica in combination with aloes, commencing with half a

grain of the former, twice or thrice daily. It manifestly acts, as Dr. Bardsley contends, by stimulating the uterine organs and improving the tone and vigour of the system. *Aconite* has been likewise tried, and apparently with advantage, by some German and French physicians. I have prescribed the alcoholic extract of aconite with decided benefit. Besides these, various other remedies have been recommended, particularly the balsams and turpentines, melampodium, savine, cantharides, assafœtida, conium, the ergot of rye, &c. This last has been favourably noticed by Dewees, Locock, Roche, Nauche, and Pauly. During the use of these medicines, and particularly of the chalybeate preparations, a full dose of calomel with aloes should be given once in the week at bed-time, and be followed by the compound decoction and tincture of aloes in the morning. The *ammoniated tincture of guaiacum* has been much used for this complaint, and has been very favourably noticed by Dr. Hannay and others.

35. Various *stimulating enemata* have been advised, particularly those with spirits of *turpentine, assafœtida, aloes, rue, savine,* (see F. 130, 131. 134, 135. 141. 150.). Dr. Shönlein prescribes an enema with aloes to be thrown up at the period when the effort at menstruation takes place. At that time, two or even more of the above substances may be employed with advantage, as proved by some cases in my own practice.

36. The *local excitement* of the uterine organs by means of medicated bougies and injections was recommended by the ancients and by the older writers, and has been advised by some modern authors. Lavagna prescribed a few drops of the liquor ammoniæ in an ounce or two of milk to be thrown into the vagina, and several physicians have tried this practice. Dr. Blundell has noticed it favourably. The injection of a few drops of eau de Cologne in warm milk was a domestic practice in this complaint in some parts of the continent. The safety of the practice entirely depends upon the particular circumstances of the case in which it is resorted to. There can be no doubt of the practice being hazardous, if it be not cautiously employed; inflammation not only of the vagina, but of the uterus also, being likely to follow the use of a too strong injection.

37. It has been attempted to excite the uterine organs sympathetically by *irritating the mammæ.* Dr. Loudon applied leeches to the mammæ with this view. Siebold recommends warm fomentations; Sir James Murray, exhausting glasses; and several writers, blisters, stimulating plasters, sinapisms, &c. to the breasts, with the same intention. I have prescribed *blisters, sinapisms,* and *issues* to the insides and tops of the thighs; *frictions* to the loins and back, with stimulating and rubefacient liniments; and *embrocations* of a similar nature applied more constantly in the same situations, with marked advantage. *Electricity* and *galvanism* directed across the uterine organs have been advised by Thomann, Alberti, Birch, Capuron, Ritter, Marcus, Aldini, Nauche, Siebold, and many others. The *hip-bath,* or mustard hip-bath, and *mustard pediluvia,* are generally of service about the accession of the periodic efforts at menstruation. If these efforts are attended by leucorrhœa, the treatment does not require any material change from that above advised; but if the colourless discharge continues or appears in the intervals, it then becomes an important complication, which will be noticed hereafter. Of other means which have been tried in this form of obstruction, notice will be taken in the sequel, as being equally appropriate to suppression, as to absence, retardation, or deficiency of the menses.

38. The *diet* and *regimen* should have strict reference to the pathological states of each case. In the plethoric, the diet should be spare; and consist chiefly of salt-water fish, and vegetables. In the delicate, weak, and chlorotic, the diet ought to be nutritious, digestible, and sufficient in quantity to supply the deficiencies in the blood and frame generally — new eggs, mutton, game, and wine being allowed. Regular exercise on foot or on horseback, and the more active amusements and exercises, should also be indulged in, especially in the open air.

39. *B.* Amenorrhœa from Congenital Malformation and Organic Lesion. — *Obstructed Menstruation; Retained Menses.* — The following malformations and organic lesions may occasion amenorrhœa. — 1st. The ovaria may be wanting or diseased. — 2d. The uterus may be absent. — 3d. Both the ovaria and uterus may be wanting. — 4th. These organs being present, the canal of the cervix uteri may be nearly or altogether obliterated. — 5th. A false membrane may cover the os uteri. — 6th. The vagina may be wanting. — 7th. The vagina may have had its canal obliterated, or the orifice closed by adhesion of the lower portion and labia. — 8th. The hymen may be imperforate. The most of these lesions are *congenital,* others are the *consequences of disease* previous to full puberty.

40. *a. Of the congenital lesions* some affect the character and developement of the whole frame, others have no such effect. — *a. Deficiency of the ovaria* is attended by a more or less masculine developement of the body at and after the period of puberty. The mammæ and external genitals are not duly developed; the sexual propensities are not manifested; the voice is harsher and deeper than usual; and a beard is observed on the upper lip. The general health may not be affected.

41. *b. Absence or malformation of the uterus* has been noticed by Siebold, Lauth, Andral, Chaussier, Stein, and others. If the ovaria exist in cases of absence of the uterus, the general developement of the body may not be affected; but if they be also wanting, in addition to the masculine character, or mixture of masculine with feminine peculiarities, the vagina, on examination, will be found to terminate in a cul de sac, the cervix and os uteri will not be detected, or not be developed, and the uterus will not be felt from the rectum. In these cases, also, the general health may be little affected.

42. *c. When the vagina is wanting,* both the ovaria and the uterus being present, the menstrual secretion may take place, its exit only being prevented, producing distension, sometimes to an alarming extent, of the uterus. The fulness in the hypogastrium is augmented at monthly periods, and the general health is very much affected. The outward signs of female puberty are present; but the vulva or external parts present no vaginal canal, or merely a commencement of it. In these cases, the patient loses her complexion — becomes pale, delicate, and thin. She complains of pains in the

back, loins, and hips; of distension of the hypogastrium, and of a sense of weight and bearing down. These symptoms are encreased every month. The abdomen increases in size; and the density of the swelling is shown by percussion. The distension of the uterus may proceed to rupture of its parietes and to the escape of the contents into the peritoneum, followed by rapidly fatal peritonitis; but more frequently death takes place from the general disorder, with prominent affection of some vital organ, before rupture takes place.

43. *d. Imperforate hymen* may be attended by many of the symptoms accompanying the early stages of absence of the vagina; but even if the cause of disorder be not attended to, the distension of the vagina may rupture the hymen before fatal injury be produced. In this case, as well as in the others, careful examinations, which ought always to be made, will show the nature of the mischief, and the mode of its removal.

44. *β. The organic lesions occasioning amenorrhœa* are as follows:—*a. Disease of the ovaries.* Dr. CHURCHILL states, that Dr. MONTGOMERY met with a case of a female with an obscure abdominal affection, who had menstruated for a time, and amenorrhœa occurred. On examination after death, it was found that there was only one ovarium, and that one had become completely disorganised. A delicate female was attended by several practitioners in succession, and lastly by Dr. FARRE and the author. Puberty was imperfectly developed, and the menses had not appeared at the usual term. She subsequently died of acute febrile phthisis. The uterus was found extremely small, and the ovaria remarkably atrophied and converted into a dense fibro-cartilaginous substance. The inspection was made in my presence by two gentlemen who had attended my lectures at the Middlesex Hospital.

45. *b. The canal of the cervix uteri may have become impervious,* or *the os uteri may be covered by a false membrane.* Cases of this kind are not so rare as was formerly supposed. These lesions, however, are more frequently a cause of suppression than of retention or primary absence of the menses. Instances illustrative of these have been furnished by RATHIEU, DUSSAUSSOY, OSIANDER, and STORR; but their importance, from their frequency, was especially insisted upon by Dr. MACINTOSH. They are usually the consequences of inflammation, which also may occasion accretion of the sides of the vagina, and obliteration of the canal. Indeed, cases of congenital obliteration of the canal may have arisen from the same cause during, or soon after, fœtal existence. It is obvious that, in those circumstances, the symptoms of the accumulation of the menstrual secretion in the cavity of the uterus will be much the same as those accompanying absence of the vagina (§ 42.), but they may not become so extreme, as an attentive examination will show the nature of these cases, and a carefully conducted operation may remove the cause before they become urgent or dangerous.

46. *c. The labia or lower part of the vagina, or both, may have become adherent,* at any period before puberty; but most frequently before nine or ten years of age. This lesion may follow inflammation of the vulva, or vagina, occurring either primarily or as a simple disease, or as a complication or consequence of exanthematous or other fevers. In these circumstances the menstrual discharge may burst the obstruction; but much more frequently its accumulation is attended by similar phenomena to those which arise from retention caused by imperforate vagina or imperforate hymen (§ 42, 43.).

47. *γ. The prognosis and terminations of this form of amenorrhœa* entirely depend upon the evidence furnished as to the nature of the malformation or organic lesion. When there is reason to infer the absence of the ovaria or uterus, or both, no immediate risk of life may be dreaded, although pectoral or other disease is apt to supervene and carry off the patient. If, however, these organs are present, and the discharge accumulates in the uterus, the result will entirely depend upon the nature of the obstruction, and the possibility of removing it before the general health suffers so severely as to prevent recovery. All these cases, however, are attended by various contingencies, even after the immediate cause of obstruction is removed, that forbid a confident, or other than a cautious, prognosis; and these contingencies relate not only to the state and liability to disorder of the sexual organs, but also to the condition and predisposition to disease in the lungs and other organs.

48. *δ. Treatment.*—It is obvious that where the uterus and ovaria are malformed and disorganised, no means can be of service. But where the obstruction is seated in the canal of the cervix, in the os uteri, in the vagina, or vulva, well devised methods may remove it. Even when it is caused by congenital absence of the vagina, the case may be highly dangerous; but it is not hopeless, as shown by one in which M. AMUSSAT (*Gazette Médicale,* Dec. 1835) operated. He succeeded in making a passage through the cellular tissue interposed between the urethra and rectum, until he reached the tumour in the pelvis formed by the distended uterus, and punctured it; he afterwards established an artificial vagina and os uteri, and ultimately restored the patient to health.

49. When the obstruction consists of occlusion of the cervix uteri, or os uteri, from either of the changes noticed above (§ 45.), an artificial opening should be made by a trocar, or by a similar instrument to that employed by Mr. STAFFORD for dividing strictures of the urethra. If the membrane covering the os uteri be thin, or internal to the orifice, it may be punctured by a strong probe. When the vagina cannot be perforated, as in M. AMUSSAT's case, the uterus may be punctured from the rectum, and its contents evacuated. In cases requiring these operations, both external and internal means should be used to prevent or remove inflammatory action, as fomentations, poultices, laxatives, anodynes, and refrigerants.

50. If the vagina or labia have become united, the adhesion may be ruptured by forcible separation; but, if this be insufficient, such an operation as the case may suggest should be attempted. Where the hymen is imperforate, the difficulty is much less, and is readily removed.

51. When the menstrual discharge is accumulated in the uterus, and has only been obstructed mechanically, the removal of the obstruction is followed by the escape of a dark, thick, treacle-like fluid, which continues to run for some days as the uterus slowly contracts. Dr. CHURCHILL recom-

mends the vagina to be syringed in these cases with warm water, and a broad binder to be applied around the abdomen. Care should be taken to preserve the passage open, and to promote the evacuation at the usual periods, until it is regularly established. Exercise in the open air, a regular state of the bowels, chalybeate medicines, and the usual means of promoting the general health, are the most appropriate to these cases.

52. In some cases, where the menstrual secretion has been accumulating in the uterus or vagina, or in both, the absorption of the more watery parts has left the accumulated matter not only thick, but grumous and gritty; and the internal surface of these organs have become inflamed and ulcerated, and their parietes thickened; very serious, difficult, and chronic disease of the uterus and its appendages thus becoming disclosed by, and following, the removal of the accumulated matter.

ii. SUPPRESSION OF THE MENSES. — *Suppressio mensium; Amenorrhœa suppressa; Suppressed menstruation.*

53. DEFIN. — *Disappearance of the menses, after having been established for a longer or shorter period, independently of pregnancy or of their ultimate cessation.*

54. Suppression of the menses may take place *suddenly* or gradually. It may occur during the period of menstruation; or the discharge may not appear either at or after the usual period. It may appear *gradually*, each successive discharge being either more scanty, or longer deferred. Thus the suppression may be *acute* or *chronic*, although cases will often occur to which the one term may be as applicable as the other.

55. *A. Acute suppression of the menses* is generally *caused* by exposure to cold, or by wet feet, bodily shock, or by violent mental emotions either just previous to, or during the menstrual discharge. The depressing passions, anxiety, insufficient clothing, and want or misery, may also produce it. Fevers, and acute diseases occurring shortly before the period, and sexual intercourse during it, will often have the same effect.

56. The phenomena or consequences of sudden suppression vary with the habit of body and temperament of the patient. In plethoric and robust females, fever, hot skin, headache, full or hard or bounding pulse, &c. are produced; and, not infrequently, most severe attacks of disease, according to the predisposition of the different organs, are the results. Hæmorrhages, inflammations, apoplexy, epilepsy, palsy, leucorrhœa, &c. are often thus occasioned. Females of a less plethoric habit of body, or of the nervous temperament, are liable to be seized with hysterical convulsions, or spasms; or with hysterical affections of various kinds; these latter often changing their seats and forms — with neuralgic pains in different situations — with syncope, or with palpitations — with aphonia, or with nervous cough — with vertigo or with headaches — with nausea or vomiting — with pains in the back, sides, or abdomen — with retention of urine, or with partial palsy or paraplegia — or with any of the affections mentioned in the articles HYSTERIA and NEURALGIA.

57. *B. Chronic suppression of the menses* is commonly a consequence of the acute, or of general debility or ill health. It may also proceed from disease of the ovaria or uterus; or from the gradual developement of organic change in some remote or vital organ, as the lungs, liver, stomach, head, or kidneys. This form of suppression may be gradual as to quantity, or the discharge may become pale by degrees, or it may appear after longer intervals, being also more scanty until it ceases altogether; or it may be variously irregular and uncertain, or painful, or difficult, and then disappear. In some instances it ceases, and leucorrhœa takes its place. It may even alternate with leucorrhœa. It may follow low, typhoid, or adynamic fevers, or other diseases which diminish the quantity, or impair the quality, of the blood; or in which large quantities of blood have been lost. I have met with many cases in which it continued long after recovery from continued fevers; the evacuation having been regular up to nearly the attack of fever, but not returning until many months after recovery from it.

58. The attendant and consequent phenomena of chronic catamenial suppression are impairment of the general health, disorders of the digestive organs, diseases of the lungs, cutaneous eruptions; various nervous or hysterical or painful affections; chlorosis or anæmia; partial attacks of palsy, curvatures of the spine; obstinate constipation and fæcal accumulations in the large bowels, disorders of the excretion of urine, &c.

59. *C.* The *diagnosis* of suppressed catamenia is of much importance. It is necessary to ascertain — 1st, whether or not the patient be pregnant; and, 2d, if the patient be not pregnant, whether or not the affections or diseases associated with the suppression be the causes or the consequences of it.

60. *a. Pregnancy* cannot be inferred to be the cause when the suppression takes place suddenly, or from any of the more energetic causes producing it, during the period of the discharge. The arrest of menstruation by conception is generally unattended by other unpleasant symptoms, but it is commonly followed by morning sickness, by alteration of the volume of the breasts, and of the sebaceous glands and colour of the areolæ. The difficulty of distinguishing between pregnancy and morbid suppression of the menses, occurs chiefly in unmarried females, but only during the earlier months of utero-gestation; and even during these months, an examination of the mammæ, of the abdomen, and per vaginam, will disclose the nature of the case. Instances, however, may occur, of pregnancy with a periodic coloured discharge from the vagina; and this may be as abundant during two, three, or more periods as usually experienced by the patient. In these cases, the evacuation generally possesses an hæmorrhagic character, and either proceeds only from the os or cervix uteri, or from a minute separation of that portion of the ovum near the cervix.

61. *b.* In most cases of acute disease appearing in connection with acute suppression of the catamenia, there will be no difficulty in determining the exact relation in which the one may stand to the other; but, in cases of chronic or organic diseases occurring in connection with chronic suppression, it is often difficult to infer whether the former or the latter has preceded the other. Most frequently, however, and particularly as respects pulmonary disease, the suppression is the conse-

quence of such disease, although various concurring causes may assist, particularly if it have taken place somewhat suddenly. Still disease of the lungs, or of the brain, or of any organ may follow suppressed menses, according to the predisposition of these organs, at periods more or less remote from the suppression.

62. The affections themselves, which appear consequently upon suppression of the menses, require to be distinguished from each other — especially those which are truly inflammatory from those which are nervous or spasmodic, or consist chiefly of altered sensibility. What I have stated in the articles HYSTERIA and NEURALGIA will assist the diagnosis; and generally it will be found, that, when the disease is inflammatory, the local and constitutional symptoms nearly correspond with each other, and with the state of the organic functions; but, when the affection is nervous, although the pain and distress may equal or even exceed that caused by inflammation, the constitutional disorder will be slight, the pulse and the organic functions being but little disturbed.

63. *D. Prognosis.* — The opinion as to the consequences and ultimate results of suppression of the menses will necessarily depend upon the nature of the causes, physical and pathological, which have occasioned it, and upon the effects of the suppression in those organs which most frequently sympathise with the genital organs, more especially the lungs, brain, and vascular system. The prognosis, therefore, depends chiefly upon the antecedent disorder or consequent malady which may present itself; the suppression, however, being a circumstance rendering an opinion of these still more unfavourable than it might otherwise be; although, in itself, and devoid of all complication, it may be only a passing or contingent disorder, which nature alone may remove, or which a judicious exercise of art may assist her in overcoming.

64. *E. Treatment.* — *a.* The *acute form of suppression* of the menses may be inferred, from what has been stated above, to be more amenable to treatment than the chronic. The means usually employed to recall the discharge are more especially indicated for it; but these should be selected with reference not only to the cause of suppression, but also to the antecedent state of health, and the associated or consequent disorders. In many cases, the hip-bath, warm mustard pediluvia, and warm drinks upon getting into bed, if employed immediately upon the occurrence of suppression, will remove it. If fever or local inflammations or congestions follow, bleeding, especially by leeches applied below the groins; the more emmenagogue purgatives, particularly calomel with aloes, &c., the spirits of turpentine in enemata, and diaphoretics with diuretics, are requisite. If the suppression be followed by severe cerebral symptoms, as phrenitis, coma, apoplexy, epilepsy, &c., as occasionally observed, the derivative bleeding should be carried as far as the circumstances of the case will suggest, and be aided by other derivative means, and by cold applications to the head, &c. In other and less urgent cases purgatives should be prescribed so as to excite, and determine the circulation to, the pelvic viscera, without producing copious discharges, which, if produced, may be injurious by deriving the current of circulation from the uterine organs.

65. If, however, the suppression occasion, as not infrequently observed, inflammation of the uterus or of the ovaria, or of both, — consequences which are often overlooked, particularly when slight or sub-acute, or when occurring in unmarried females, — vascular depletions, cooling diaphoretics and aperients, derivatives and the other means advised for inflammations of the *ovaria* or of the *uterus* are requisite.

66. In most instances, the chief efforts to restore the catamenia should be made shortly before the approach of the next period. Leeches may then be applied to the groins; and a hip-bath, or pediluvia; warm clothing, especially around the hips and thighs; and emmenagogue purgatives, may also be prescribed. The following have proved efficacious in many instances: —

No. 291. ℞ Hydrarg. Chloridi, gr. xii; Aloës Socot. ℈ j: Pulv. Capsici ℈ j.; Olei Juniperi Sabinæ q. s. *m.* Fiant Pilulæ xij. quarum capiat duas omni nocte.

No. 292. ℞ Sodæ Biboratis ʒ ss.; Aloës Socot. Pulv. Capsici, āā ℈ j.; Olei Lavand. q. s. *m.* Fiant Pilulæ xviij. quarum capiat duas ter quotidie.

67. Whilst evacuations are required in connection with such means as may excite the uterine discharge when suppression occurs in strong or plethoric females, or occasions acute disease of some important organ, as the brain, lungs, liver, or uterine organs themselves, other means are often necessary, when the suppression takes place in spare, delicate or nervous females. It should not be overlooked, however, that local inflammations or congestions may occur in these persons, in such circumstances, and require a somewhat similar, although less energetic practice; but more frequently suppression in them demands a recourse to antispasmodics in conjunction with narcotics. The external and internal derivatives, the emmenagogue purgatives and enemata, already mentioned, and, in many instances, the application of leeches below the groins, at the proper period, should be prescribed; but, in addition to these, antispasmodics, such as ammonia, assafœtida, castor, camphor, madder, capsicum, rue, savine, &c., variously conjoined with each other, and with conium, or stramonium, or belladonna, digitalis, &c., may be prescribed, particularly when much pain is complained of, or spasms occur, in consequence of the suppression. In some of these cases, the suppression is favoured by poor or deficient blood; and in these, the preparations of iron should be combined with one or more of the above antispasmodics and narcotics.

68. *b.* The treatment of *chronic suppression* of the menses should also be dependent upon the cause, and upon antecedent and consecutive disorder. If it proceed from progressive organic disease in the lungs, liver, or other organs, the treatment should be mainly directed to the diseased part; although, even in these circumstances, local depletions in the situation already stated, and other derivative means, may be employed with benefit. When it is caused by repeated or severe inflammations of the ovaria or uterus, the means should have reference to these. The ovaria, however, may be so changed by inflammation, as to be incapable of exciting the vascular activity of the uterus so as to produce the menstrual discharge; but these changes are rather inferred from the history of former disorders, than manifested by existing phenomena. When the

uterus is affected so as to obstruct the discharge, or to cause its retention, without preventing its production altogether, the nature of the lesion may be ascertained, and a remedy be found. Inflammation may close the cervix uteri, or cover the os uteri with a false membrane, or may even obliterate the vagina, as noticed above. In these circumstances, the means already indicated (§ 49.) should be resorted to.

69. Even when the obstruction cannot be referred to organic disease of the ovaria or of the uterus, there may be still great congestion of these organs; requiring local depletions for its removal. Many of these cases present indications of debility, and are attended, moreover, by leucorrhœa, which may be either periodic, or more or less continued, this discharge being often considered as a consequence of debility merely. But the local congestion may be considerable nevertheless; and although the general pallor and state of the circulation may indicate some degree of anæmia, the uterine organs may contain an undue proportion of blood. In these cases, the employment of stimulating injections per vaginam, as advised by the ancients, and revived by some moderns, might convert suppression from congestion into actual inflammation of the uterine organs; and in those cases where the congestion and suppression are associated with leucorrhœa, a recourse to astringent injections, in order to remove the latter, may be followed by the same bad consequences, if local depletions, and other suitable means directed to the removal of the congestion, have not preceded such injections.

70. When uterine congestion or inflammatory action is not present, or has been removed, the treatment should depend much upon the states of the vascular system, and of organic nervous power. If the former be not plethoric, and if the latter be much impaired, the preparations of iron, with iodine, or other appropriate medicines; the ammoniated tincture of guaiacum, the stimulating antispasmodics, and external and internal derivatives, are generally serviceable.

71. iii. COMPLICATED AMENORRHŒA. — I have already noticed (§ 57.) some of the most important associations of amenorrhœa, and shown that the obstruction, particularly when taking place slowly, or becoming chronic, is often owing either to debility or some constitutional infirmity, or to the gradual developement of some organic malady, as of the lungs, brain, liver, &c. The complications most frequently observed are, — *hæmorrhage* from various parts, *inflammations, phthisis, epilepsy, hysteria, chlorosis, anæmia, palsy, retention of urine, chorea, cutaneous eruptions, diarrhœa*, and various *disorders of the digestive organs*. These require a few remarks.

72. *A.* Amongst the most important of these are *vicarious hæmorrhagic discharges* from some organ or part, or *vicarious menstruation* as it has been commonly, but incorrectly, termed. These discharges, occurring during suppression, have been thus termed owing to their recurrence; but, although recurring, they are not always strictly periodic, or of monthly appearance. Writers have been more desirous of recording cases of this description, than of observing carefully the procession of the morbid states constituting them; and several have viewed the hæmorrhagic discharge as an eruption of the menses in some singular locality in place of from the uterus, instead of observing the sequence of morbid actions, and the relations between the contingent or vicarious discharge and the suppression. Thus hæmatemesis is a not infrequent form of the vicarious discharge, and is usually attributed to a periodic determination of blood to the villous surface of the stomach, instead of the uterus; but, without denying that such is sometimes the case, I have met with instances which have led me to infer, that hepatic or portal obstruction has taken place in plethoric persons, and given rise to hæmorrhage from the stomach, which either has anticipated and substituted the catamenia, or has occurred in connection with suppression, and often in consequence of the operation of the same causes as have produced suppression. The same remarks apply equally to the substitution of a hæmorrhoidal discharge.

73. The causes of suppression, also, particularly those which determine the flux of blood from the lower portion of the body to the head, not infrequently induce epistaxis, or even hæmorrhagic discharges from the ears, eyes, &c., especially in those who are constitutionally or otherwise disposed to epistaxis, or hæmorrhages from these parts. In these cases, the irregular distribution of blood — the diminished determination of it to some parts and its accumulation in others — is followed by its discharge from these tissues of the congested organ or part, which most readily admit of its escape. The circumstance of these vicarious discharges generally following, and but rarely anticipating, the precise period at which menstruation should have occurred, sufficiently indicates the nature of these occurrences. Besides the situations already mentioned, hæmorrhagic discharges may recur in connection with amenorrhœa, from the bronchi or lungs, the gums, the fauces, the mammæ, the urinary bladder, the bowels, from ulcers in any situation, from varicose veins, &c. Of the associations of amenorrhœa with *inflammations* or with *phthisis* which are of frequent occurrence, either preceding the other, no further notice need be here taken, than that the former are more obstinate and unfavourable when thus allied, — and that the latter proceeds much more rapidly to its usual termination when it is thus complicated.

74. *B. Epilepsy* is generally consecutive of acute amenorrhœa when observed in connection with it; but the numerous and varying forms of *hysteria*, whether assuming a spasmodic or a neuralgic or painful form, may either precede or follow the suppression. The same remark may be extended to *chlorosis, chorea*, and *anæmia*, either of which is often thus associated, and more or less intimately dependent upon amenorrhœa. The different forms of *palsy* are rarely seen connected with suppression otherwise than as a consequence of it. I attended, a few years ago, with Mr. FLOCKTON, a young lady who was afflicted with prolonged amenorrhœa, followed by paraplegia, retention of urine, diarrhœa, and occasional attacks of vomiting, with which the diarrhœa often alternated. She had been many months in this state, and a great diversity of treatment had been employed without avail. The disease was ultimately removed by means which will be noticed in the sequel. Disorders of the digestive and cutaneous eruptions are too varied in their characters to require notice in connection with amenorrhœa.

75. *C.* The *prognosis* in complicated amenorrhœa depends upon the nature of the associated disease. It has generally been considered that the *hæmorrhage* which often occurs vicariously in some cases of this description is not attended by any risk, and is not followed by other disease, or even by much functional disorder. But, although this may be true in the majority of cases, more particularly as respects epistaxis, hæmorrhoids, hæmatemesis, &c., it by no means generally obtains, especially as regards hæmoptysis, and hardly as respects hæmatemesis. Hæmoptysis should always be viewed in an unfavourable light, and its dependence as much upon incipient tubercles, or congestive inflammation of the lungs, or both, as upon amenorrhœa ought to be inferred. The prognosis in the other associations of suppression, depends as much upon circumstances peculiar to the patient as upon the particular complication present; and requires no further notice than has been taken above (§ 73, 74.).

76. *D.* The *treatment* of the complicated obstruction should be directed with the same intentions as have been already stated. In the acute complications, particularly those with hæmorrhagic, apoplectic, epileptic, and inflammatory seizures, in plethoric habits, general and local bloodletting, emmenagogue cathartics, diaphoretics, &c. are requisite; and when the other complications occur in these habits of body, a similar treatment, especially local bloodletting in the situation above pointed out, should be prescribed, and be aided with the other means already noticed, according to the particular associations observed.

77. In the more chronic complications, the means should be adapted to the peculiarities of such cases, which are too numerous to admit of even a partial notice. The most of those, however, will allow of a trial of the means already advised for delayed and suppressed menstruation; and, although the exact recognition of the complication present should determine the mode of treatment, still that which is more immediately directed to the obstruction should not be neglected. The exhibition of the spirits of turpentine in alterative or purgative doses, according to circumstances; a mild course of mercury, or of iodine, or of both, or of iodine and iron; a recourse to digitalis, conium, stramonium, belladonna, madder, rue, savine, &c., are the most deserving of notice. Where the obstruction is connected with spasmodic or painful disorders, turpentine, iron, stramonium, belladonna, opium, hydrocyanic acid, ammonia, &c., are severally useful. When it is related to chlorosis, chorea, or anæmia, the preparations of iron are particularly indicated, and the aid of aloetic and warm purgatives required.

IV. DIFFICULT MENSTRUATION. — SYN. *Dysmenorrhœa*, Vogel, Sagar. *Dysmenia*, Swediaur. *Menorrhagia difficilis*, *M. Stillatitia*, *Amenorrhœa difficilis*, *Amen. partialis*, Auct. *Paramenia difficilis*, Good. *Menstrua difficilia*; *M. Dolorosa*. *Beschwerliche monatliche reinigung*, Germ. *Menstruation difficile*, Fr. *Menstruazione difficile*, Ital. *Painful menstruation.*

78. DEFIN. — *Menstruation preceded and accompanied by acute pain in the abdomen and hypogastrium, and often in the back or mammæ, the discharge being frequently scanty, or presenting morbid appearances.*

79. This form of uterine disorder is of frequent occurrence, and is not only productive of extreme suffering, but often of very serious consequences. Dr. ASHWELL remarks, that it often prevents conception; and, if pregnancy has occurred during its continuance, there is risk of abortion. Although, in itself, it is not a fatal malady, yet malignant diseases have followed its protracted existence; and it is generally very difficult of cure.

80. i. *Causes.* — Both married and single females, the latter more particularly, are liable to it. Dysmenorrhœa may occur in all temperaments and habits of body; but more frequently in women of irritable, hysterical, and nervous temperaments, and of spare, strumous, and phthisical constitutions than in others. It is probably somewhat favoured by indolence and full or rich living. The most common exciting causes are, exposure to cold in any form during menstruation; sudden fright, or shock, or violent mental emotions or disappointed affections, especially when occurring at this period; exposures to cold soon after parturition or abortions, &c. Indeed, the same causes which occasion suppression of the menses, or inflammation of the uterus, may occasion dysmenorrhœa.

81. Difficult menstruation may occur at any period, and is rarely confined to one or two periods. It may be traced back in some cases to the very commencement of the epoch. The *amount* and *character* of the pain may vary much. It may be moderate and last but a few hours each time, or it may be so severe as to amount to extreme torture, and to occasion faintings or severe retchings; and even to render the patient a permanent invalid. The pain may also be *neuralgic* or *inflammatory* in its character. Owing to these variations, dysmenorrhœa has been divided by Dr. CHURCHILL into — 1st. the *neuralgic*; 2d. the *inflammatory*; and 3d. the *mechanical* or *obstructive*. M. ROCHE has treated of it as *idiopathic* and *symptomatic*, the latter generally depending upon inflammatory action in the uterus. Mad. BOIVIN and M. DUGÉS have viewed it as commonly proceeding from inflammation. Dr. ASHWELL has arranged the forms of amenorrhœa into — 1st. The *irritable* or *neuralgic*. — 2d. The *plethoric*. — 3d. The *congestive*. — and 4th. The *obstructive*. The chief objection to this division is that the *second* and *third* must be necessarily alike; for, if a plethoric and a congested state of an organ hardly admits of being distinguished from each other, in respect of their physical conditions, how can they be recognised by aid merely of their physiological phenomena? It would be better, therefore, to consider the *second* variety as one of congestion which may sometimes go on to, or be attended by, an inflammatory state of the internal surface of the uterus, which state, however, may also exist in the *first* variety, the neuralgic character however predominating, and distinguishing it.

82. ii. *Description.* — *A. Neuralgic* or *irritable dysmenorrhœa* occurs chiefly in unmarried females, and in the married who have not borne children. Although it may appear at any period of the menstrual age, it is most common about the thirtieth year. It is generally observed in nervous or hysterical and irritable temperaments, and in spare and delicate habits of body. The monthly paroxysms of pain have all the characteristics of

neuralgia. They are often preceded or followed by headache. The pain often commences in the region of the sacrum, and extends around the lower part of the abdomen and down the thighs. The suffering is often very great; in some cases it is constant; in others, it is remittent. As it continues, a forcing or bearing down sensation is occasionally present, and aggravates the distress; and in some instances the torture is so extreme that the patient rolls about on the abdomen, endeavouring to procure ease from pressure; or is afflicted with constant retchings. These sufferings may endure for only a few hours, or they may continue a day or two before the discharge commences. This is usually scanty at first, or in slight gushes; and the quantity varies in different persons, or even in the same person at different periods. It is often altogether scanty, rarely too much. It is frequently natural in appearance; but it is also often pale, or mixed with small clots, or with shreds, or with a bran-like matter. More rarely it contains shreds of membrane, as observed by Morgagni, Denman, Burns, Blundell and others.

83. The cervix uteri undergoes the usual change at this painful period; it becomes swollen and softer, with an increase of heat; and the os uteri is somewhat more open, than in the interval. As the discharge proceeds, the pain subsides gradually, but not so quickly as in the inflammatory variety; and as it disappears, neuralgic pains are sometimes felt in other parts. The pulse is seldom affected during the attack, further than being weaker than usual; and febrile symptoms are rarely observed. In a few cases, the bowels are irregular during the period. Although the health may not suffer in the interval, yet in the severer cases, or when the complaint has been neglected, the patient complains of headaches, of pains in the back, which are increased by standing or walking, and of various disorders of the digestive organs, consequent upon the general impairment of health, arising from protracted sufferings.

84. The membranous shreds passed in some of these cases, evidently consist of plastic lymph thrown out in the cavity of the womb. In a few cases, this substance has been voided nearly entire as moulded upon the internal surface of the uterus, and has given rise to suspicions of pregnancy, its expulsion being attended by violent forcing pains. It is discharged, in some instances during several successive periods, in others only occasionally. Dr. Denman supposed that females could not conceive who voided these membranes; and such is the case in the great majority of instances, although Dr. Blundell and Dr. Churchill believe that conception is possible.

85. *B. Congestive and inflammatory Dysmenorrhœa.* — In some cases the patient complains of lumbar pain, of a sense of weight and of bearing down in the pelvis, for two or three days before the expected return of the menses. Frequent micturition, constipation of the bowels, severe pain in the region of the uterus, restlessness, and violent forcing supervene. The patient is not feverish, but the pulse is often quick and irritable. The skin is generally perspirable. A sense of exhaustion, with anxious, pallid countenance, is usually felt as the affection proceeds. After some hours, or even after a day or two, the attempts to micturate, or the severe forcing pains, extending sometimes through the abdomen, from the loins, hypogastrium, and hips, are followed by the expulsion of coagula, or occasionally of portions of membrane, the discharge being generally scanty, or in irregular gushes, and at intervals sometimes almost colourless. The forcing pains often resemble those of labour, but the suffering is generally more constant than in it. Sometimes the uterine pain is attended by a sensation as if the pelvis contained some foreign body that should come away; and in these cases, considerable masses of coagula, or of albuminous concretions or membrane, have been passed, affording much relief. This congestive form of dysmenorrhœa, when severe or prolonged, is often followed, for some days, or even for the greater part of the interval, by leucorrhœa, which tends further to weaken the patient, and to superinduce more extensive disease.

86. In some females, particularly in the plethoric and in the sanguine temperament, the disorder assumes a more inflammatory form; or the whole frame exhibits more or less of inflammatory or febrile commotion. It usually occurs earlier in life than the neuralgic form, chiefly in the unmarried or in those who have had children. It is commonly caused by cold, particularly when applied to the feet, thighs, and hips, as when seated on cold or damp seats. It may also proceed from some sudden shock or constitutional disturbance; and may assume various grades of severity. In its slightest states, it not infrequently affects plethoric and robust young females from the first menstrual period until marriage.

87. It usually commences with chills or slight rigors, followed by flushing, feverishness and headache, a few days before the appearance of the catamenia; with these the patient complains of pains in the back and hypogastrium, of aching in the limbs and lassitude; of intolerance of light and sound, and fever. The skin is hot, the pulse full and frequent, the bowels constipated, and the mammæ painful and somewhat swollen (Dewees); but the febrile commotion is rarely so high as to cause temporary or night delirium. These symptoms subside as the discharge proceeds, especially when it is abundant. When it is scanty, they often continue in a less degree, or become aggravated for a time as it disappears; but it is generally more abundant in this, than in the other states of the disease. It may be accompanied with the membranous shreds or exudations, as in the other varieties.

88. During the intervals the general health may not be materially affected, although headaches are not infrequent, and leucorrhœa is often constant. The severity of the attacks is not so regular in intensity as in the neuralgic form, and sometimes a period or two elapses with little suffering. On examining per vaginam during the severity of the pains in the congestive or inflammatory states, evidence of engorgement of the uterus is generally furnished, with swelling and increased heat of the cervix uteri; but there is no external tenderness on pressure.

89. All the forms of dysmenorrhœa, when very severe, generally prevent conception; but the slighter degrees of the complaint will not have this effect. In one of the severest and most obstinate cases, for which I have been consulted, the patient had a family after marriage.

90. C. *Obstructive dysmenorrhœa.* — *Dysmenorrhœa from mechanical obstruction* consists of a narrowing or *stricture of some part of the canal of the cervix uteri.* This variety of dysmenorrhœa was noticed by several continental authors of the last century; and was enumerated by M. CAPURON as one of the chief states of the disease; but Dr. MACINTOSH was the first to insist on its frequency and importance; and Drs. CHURCHILL and ASHWELL have directed their attention to it; but they believe that cases of this kind are rare; and that the stricture is only a part of the complaint, and often exerts no influence upon it, inasmuch as the dilatation of the stricture was not, in most of their cases, followed by an alleviation of suffering. It is natural to infer that, if the stricture had been the real cause of the disease, an accumulation of the menstrual fluid would have taken place in the cavity of the uterus; but this appears not to have been the case. Although an infrequent cause of dysmenorrhœa, it is of sufficient importance to determine its existence in all doubtful and obstinate cases.

91. iii. *Diagnosis of Dysmenorrhœa.* — This complaint is readily distinguished; it is only when it is accompanied with the discharge of an albuminous exudation or false membrane moulded within the uterus, resembling the decidual nidamentum of the ovum, that a distinction is required. The duration of the complaint, the state of the menstrual discharge on former occasions, the length of interval from the previous period, and the physical characters of the substance voided, are sufficient to determine the nature of the case. Dr. MONTGOMERY has very accurately described this substance, and has confirmed the account formerly given of it by MORGAGNI. He states that it differs from the true decidua in not being intended to become a medium of nutrition for the ovum; hence it is not furnished with a structure such as would be necessary for this office. It is thin, and unsubstantial in texture; of a dirty white or yellowish colour after the agitation of it in water; and is devoid of the soft, rich and pulpy appearance and vascular colour, and of the numerous foramina for the reception of the nutrient vessels from the uterus, characterising the true decidua; it is also destitute of the little colytedonous sacculi essential to the latter structure. No trace of the transparent membranes of an ovum can be discovered within it or attached to it; and should it happen to come away entire, in the form of a hollow triangular bag, it never contains a duplicature of itself forming an inner pouch or reflex layer, as in the case of the natural decidual envelopes of the ovum.

92. iv. *Complications of Dysmenorrhœa.* — Most of the complications presented by suppressed, is also observed associated with painful, menstruation; and of these, hysteria and disorders of the digestive organs are amongst the most frequent. I have met with instances of a discharge of membranes from the uterus during dysmenorrhœa associated with painful discharges of similar membranes from the intestines, and with the severer forms of hysteria and spinal irritation. Leucorrhœa is an equally common complication with hysteria, and is often only a part of the uterine disorder causing dysmenorrhœa. Neuralgic and other nervous complaints are not infrequently associated with it; but the observations I have offered on the complications of amenorrhœa (§71. *et seq.*) are equally applicable to those of dysmenorrhœa.

93. v. *Prognosis.* — Dysmenorrhœa is dangerous only as respects its consequences when neglected, and when it is complicated with some pectoral or other serious disease. Although it be obstinate, severe and prolonged, as long as the general health does not suffer, and no other local malady appears, its chief importance consists in the distress it occasions, and the effect it may have upon the generative function; for, although a female may conceive, who is suffering any of the forms of the malady, even in their severest states, as when attended by the expulsion of albuminous exudations, still this is an infrequent occurrence, sterility being a much more common result. Generally, however, the disease is cured by medical treatment, or by marriage, and child-bearing; and it necessarily disappears at the change of life. The possibility of its being followed, particularly when it continues up to, or past, the fortieth year, by organic, or even by malignant disease of the uterus, especially of the cervix and os uteri, ought not to be overlooked; and this contingency is, perhaps, more likely to occur in the neuralgic than in the inflammatory form. The mechanical state of the disease may be viewed as more unfavourable than the others; as the removal of the stricture is not always attended by a removal of the malady. Dr. MACINTOSH, however, states that he cured twenty-four cases out of twenty-seven, and that of the twenty-four, eleven afterwards had children. This rate of success has not been confirmed by the experience of other physicians.

94. vi. *Pathology.* — The questions most agitated in respect of the nature of dysmenorrhœa are — whether it depends or not solely upon irritation or altered nervous sensibility, or solely upon inflammatory action — whether it is merely neuralgic or entirely inflammatory. That a degree of inflammatory irritation exists in the internal surface of the uterus, even in the neuralgic form of the disease, is proved by the formation and expulsion of a false membrane in many cases of that form. That this membrane is produced by a similar state of inflammatory action to that which sometimes occurs in other mucous surfaces, and gives rise to a similar exudation, is most probable, notwithstanding the absence of general inflammatory phenomena and the neuralgic character of the pain. The absence of these phenomena is evidently owing to the nervous temperament, and disposition to morbid or exalted sensibility, in connection with the state of the vascular system, and probably also to the nature of the more common exciting causes. In these cases, the inflammatory irritation existing in the internal surface of the uterus excites, or is attended by, an inordinate manifestation of morbid sensibility, although it is insufficient to develope general vascular reaction, owing to the general deficiency of blood in the vascular system, and hence the neuralgic character prevails. In those cases which are manifestly congestive or inflammatory, the nervous susceptibility being less, whilst vascular fulness and disposition to encreased action are much greater, these latter conditions are more prominent. That the albuminous exudations, voided in the different varieties of the disease, are the results of states of local action similar to those which sometimes take place in other mucous sur-

faces, may be inferred not only from their similarity of characters, but also from other phenomena, more particularly from the violence of the pain attending their detachment from the surface on which they are formed, as evinced by their formation in the bowels (see art. Intestines, § 52.) as in the uterus. In two of the complicated cases alluded to above (§ 92.), one of which was seen also by Sir B. Brodie and the late Dr. Davis, the other by Dr. Ashwell, in consultation, the albuminous exudation or membrane was voided from both the intestines and uterus, with violent suffering referrible to both these situations, and with severe and obstinate sympathetic disorders of an hysterical and neuralgic nature.

95. vii. *Treatment.* — The *indications of cure* are the same in all the forms of this malady: these are — 1st. *To alleviate the suffering at the menstrual period;* and — 2d. *To restore during the intervals the healthy condition of the organ.*

A. The *first of these intentions* is, however, to be fulfilled by somewhat different means, in the several forms of the disease.

96. *a.* The *neuralgic variety*, as I have already stated (§ 82.), ought not be viewed as being entirely devoid of a local inflammatory character, at least in many cases, or in those attended by the production of an albuminous exudation, because the symptomatic phenomena of inflammation are not manifested. Therefore, unless there be manifest deficiency of blood in the vascular system, leeches should be applied below the groins, as above advised (§ 67.), and be followed by fomentations with hot sponges. After the bleeding has ceased, the warm bath, or warm hip-bath, and the anodynes about to be advised, may be resorted to, and even repeated. Where local bleeding is not indicated, and after it has been employed, opiates, or henbane, or belladonna, or stramonium, conium conjoined with camphor, assafœtida or other antispasmodics, are generally beneficial. I have prescribed the following with advantage: —

No. 293. ℞ Sodæ Biboratis ℈ ij.; Extr. Conii ʒ ss.; Extr. Strammonii (vel Extr. Alcoholici Aconiti) gr. iij.; Pulv. Capsici gr. vj.; Olei Juniperi q. s. *m.* Fiat massa æqualis quam divide in pilulas xviii, è quibus capiat duas, tertiis vel quartis horis, ad tertiam vel quartam vicem.

No. 294. ℞ Pilulæ Galbani Comp. ʒ ss.; Extr. Hyoscyami ℈j.; Sodæ Biboratis, ʒss.; Extr. Belladonnæ, gr. iv.; Olei Juniperi, q. s. *m.* Fiant pilulæ xx. quarum capiat duas, tertiis vel quartis horis.

No. 295. ℞ Camphoræ rasæ ℈ j; tere cum Mucilag. Acaciæ ʒ iij. et adde Aquæ flor. Auranti ℥ vjss.; Sodæ Biboratis ℈ ij.; Spirit. Ætheris Nit. ʒ iij.; Spirit. Juniperi Comp. ʒ iij.; Tinct. Hyoscyami ʒ ij. *m.* Fiat mist. cujus capiat coch. ij. larga, secundis vel tertiis horis.

97. The narcotics just mentioned may be prescribed in the form of *suppository*, or in *enemata;* but they ought not also to be given by the mouth when thus employed, nor should they be prescribed in large doses in enemata, as serious effects may follow. In those cases which are attended by a sensation of a substance pressing down in the pelvis, as if requiring to be brought away, the ergot of rye and the biborate of potash will often afford relief, particularly when there are coagula, or albuminous exudations in the uterus, or passing the cervix. *Injections per vaginam* of the warm decoction of poppies, or of warm water, containing the extract of conium or of hyoscyamus, several times a day; and *hot fomentations* of the same kind over the pubes and hypogastrium will frequently be of service. *Plasters* containing the extract of conium, or of belladonna, or of aconitum, and camphor, may afterwards be placed upon the sacrum, or over the hypogastrium, in the more severe and obstinate cases.

98. *b.* The *congestive and inflammatory states* of dysmenorrhœa require, with very few exceptions, either general or local bleeding, or even both, as early as the attack comes under treatment. Leeches applied to the thighs are preferable to cupping on the loins in these cases; for I have known instances of suppression of the menses caused by the latter. The bleeding, however, should not be too profuse, as it may thereby interfere with the catamenial discharge; it may, however, be repeated at the return of the period according to the peculiarities of the case. After vascular depletions, cooling diaphoretics, conjoined with narcotics, are generally beneficial; particularly the liquor ammoniæ acetatis, with camphor, spiritus ætheris nitrici, and any of the narcotics already noticed. Warm poppy fomentations, the warm bath, and the other means already noticed (§ 97.) will also be frequently of service. The bowels should be kept gently open by means of cooling laxatives.

99. *B. During the intervals* between the menstrual period, the treatment should be varied conformably not only with the varieties above distinguished, but also with the circumstances of the case. — *a. In the neuralgic form*, much attention should be paid to the state of the digestive functions, and to diet and regimen. The biliary secretions ought to be promoted by blue pill, or the hydrarg. cum creta, taken alternate nights; and by a stomachic aperient, the following morning or night. After the abdominal secretions and excretions have been improved, chalybeate preparations or mineral waters may be tried, and be aided by residence in a pure air; by exercise on horseback, or by regular walking exercise, taken moderately, twice or thrice daily; and by warm salt-water baths, followed by cold salt-water bathing or the daily use of shower baths.

100. The several preparations of iron have been advised in this complaint. The iodide of iron is one of the most efficacious. It may be given in the syrup of sarsa. Dr. Locock advises the vinum ferri with the spiritus ætheris sulph. comp. The mistura ferri comp. and the alkaline combinations of iron are also very serviceable. Dr. Dewees makes favourable mention of the tinctura lyttæ, and more especially of the tinctura guaiaci and tinctura guaiaci ammoniata; and Dr. Chapman advises the decoctum senegæ. Dr. Churchill recommends blisters to the sacrum, or a caustic issue in the same situation. I have prescribed pea issues in the insides of the thighs with success.

101. The more obstinate cases, and those especially which are attended by the expulsion of albuminous exudations, may resist most of the means now mentioned; particularly when the malady is perpetuated by persistence in one of its most common exciting causes, namely, masturbation. In these circumstances, Plummer's pill, or the blue pill, may be given, every night, alone or with soap and ipecacuanha, until the gums are affected; or the spirits of turpentine, in the dose of about one drachm, may be taken at night and

upon waking in the morning, on the surface of a cup of milk, or in any other vehicle, for some days before the next menstrual period. Injections *per vaginam*, of warm water containing a little of the biborate of soda, especially when the period of the catamenia approaches; the same substance taken internally, alone or conjoined with any of the more congruous medicines already noticed, or with the supertartrate of potash, when the bowels require to be kept freely open; and warm pediluvia, hip-baths, or the warm bath, continued or repeated according to circumstances, may further be resorted to.

102. *b. In the congestive and inflammatory* states of dysmenorrhœa, spare diet, regular and active exercise, particularly on foot and in the open air, with attention to the state of the bowels, should be especially insisted on. If the case prove obstinate, or continue notwithstanding the more active means advised for the treatment during the menstrual period (§ 98.), it will be necessary to have recourse either to the means already advised for the more severe cases attended by the discharge of albuminous exudations (§ 101.), or to a mild mercurial every night, the supertartrate of potash with biborate of soda being taken in the morning. In some cases of this state of the disease, the iodide of potassium and the liquor potassæ, given in suitable vehicles, have proved efficacious. Of the local application of iodine advised by some recent writers, in some obstinate cases of dysmenorrhœa, I have no experience; and I know of no circumstance that can render it appropriate. On the approach of the next menstrual period, leeches applied below the groins, and the means advised above (§ 101.) should be resorted to. If the bowels be confined, the remedies just mentioned, or the biborate of soda with aloes, may be prescribed. In cases of this kind, as well as in suppression of the menses, Dr. MEAD had great faith in *hellebore* given until a free operation was effected on the bowels.

103. C. The *mechanical or obstructive variety of dysmenorrhœa* has been remedied by the introduction of bougies; which, however, require both care and dexterity to prevent injurious consequences. As the removal of the stricture is not necessarily followed by the cure of the complaint, the medical treatment recommended should also be employed according to the circumstances of the case.

V. EXCESSIVE MENSTRUATION. SYNON. — *Menorrhagia* (from μηνες, menses, and ῥηγη, a rupture); ̔Ροος πολλος, Hippocrates; *Hæmorrhagia uterina, H. uteri, Menstrua immodica, M. superflua*, Auct. var.; *Metrorrhagia*, Frank; *Hysterrhagia sanguinea*, Swediaur; *Paramenia superflua*, Good; *Menorrhœa, perte uterine*, Fr.; *der Mutterblutfluss*, Germ.; *Inordinate or profuse menstruation.*

CLASSIF. — II. CLASS, I. ORDER (*Author*).

104. DEFIN. — *A too abundant or a too frequent return of the uterine discharge.*

105. In the article upon HÆMORRHAGE FROM THE UTERUS, I have treated of "discharges of blood from the uterus occurring independently of the menstrual evacuation;" and have considered them with due reference to the several periods of life and to the various circumstances in which they occur (*see art. referred to* § 220. *et seq.*). I here confine myself to the consideration of excessive or profuse menstruation, as above defined.

106. The quantity of blood discharged from the uterus at each menstrual period has been variously estimated. In temperate climates it varies from four to ten ounces — from five to seven or eight being the usual amount in this country. Less than four may be considered as scanty, and more than nine or ten excessive. That climate influences the quantity of this discharge is extremely probable; but I do not believe that it has this effect nearly to the extent estimated by some writers; for it is impossible to obtain precise information on the subject. Even when the quantity is unusually large, the discharge may take place in a short period, or during a longer time in recurring gushes; or it may continue for a long period, as a slight or moderate drain.

107. Dr. CHURCHILL distinguishes *three forms* of menorrhagia. — 1st. That in which the discharge is of the natural character, but is excessive as respects its quantity, continuance, or frequency of recurrence. — 2d. That in which the discharge is mixed with clots of blood, but is not attended by alteration of the cervix or os uteri. — 3d. That in which there is change in the cervix, or in the size or position of the uterus. This division is not altogether undeserving of adoption; but as the discharge must necessarily present the characters either of the menstrual fluid, or of hæmorrhage, it is preferable to arrange the forms of the disease accordingly, namely, into *true menorrhagia*, and *hæmorrhagic menorrhagia.*

108. i. *Menorrhagia, with a natural state of the Discharge — True Menorrhagia.* — In this variety the discharge is excessive either as to its quantity, its continuance, or the frequency of its recurrence. It may come on suddenly and most abundantly, thus continue for a longer or shorter period, almost cease for some hours, and then return more or less copiously. It may recur or remit in this manner several times or for several days; the excessive discharge assuming this form at each period. Sometimes it commences and proceeds regularly, in an unusually abundant quantity, the period not being much prolonged; but, more frequently, it lasts for a long time, occasionally for a fortnight or even longer, the quantity not being great at any time, but becoming so from its continuance. In other cases, the discharge returns every two or three weeks, without being in an augmented quantity. This last state is not infrequent among unmarried females of a plethoric system, or sanguine temperament, with much activity of the uterine organs.

109. This variety of menorrhagia is often associated with uterine leucorrhœa, which may either precede or follow each recurrence of it. In some cases, also, leucorrhœa only may have been the primary disorder, menorrhagia supervening; whilst, in others, it may have followed this malady. An examination per vaginam furnishes no information, excepting of a negative kind. There are neither heat, nor tenderness, nor swelling, of the os uteri.

110. After repeated returns of menorrhagia, the constitution indicates the debility and loss of blood produced by it; and the patient complains of weakness or aching across the loins and hips; of languor, exhaustion, faintness, tinnitus aurium, giddiness; and of headache, or throbbings in the

temples, or palpitations of the heart. The countenance is pallid, and the lips, tongue, and gums are pale. If the disease continue, these symptoms become aggravated; the stomach and bowels are deranged; pains in the side, particularly the left, are complained of; the face is sallow, and all the indications of anæmia appear. Ultimately ædema of the ancles, anasarca, diarrhœa, convulsions, and various nervous affections may supervene.

111. ii. *Menorrhagia with discharge of pure blood or coagula — Hæmorrhagic Menorrhagia.* — This variety is met with chiefly in married females, of a leucophlegmatic temperament, and in those who have been weakened by disease, or by frequent child-bearing, or by prolonged suckling; and in these circumstances it is generally complicated with leucorrhœa. But a different, and a more acute, or active state of the complaint occasionally is met with, which has been altogether overlooked by Dr. Churchill. I have observed it on several occasions; and it has also been noticed by Dr. Ashwell. This variety of menorrhagia has therefore been properly divided by him into *three states*, viz. the *active*, *passive*, and *congestive*. The first and second of these are generally attended by a natural state of the cervix and os uteri, whilst the third is usually accompanied with some change in the state and position of these parts.

112. *A. Active or Acute Hæmorrhagic Menorrhagia — Inflammatory Menorrhagia.* — This is the least frequent kind of the complaint. It occurs chiefly in robust or plethoric married women, who live fully, or who addict themselves to sexual excesses; but it is also, although more rarely, met with in young, florid, and plethoric unmarried females; and in both classes of patients it may assume, according to the temperament and habit of body, more or less of an inflammatory, or of a spasmodic character. In this state of the complaint, a sense of tension, weight or fulness in the pelvis, is complained of for a day or two before the accession of the discharge. Sometimes there is also a sense of throbbing in the uterus, with pain, swelling or tenderness of the mammæ; and occasionally even pain in the uterine region. The pulse is quickened, and sometimes fuller and stronger than usual; and there are generally headache, costiveness, and sympathetic fever. In the spasmodic state, the pain in the uterine region is more severe, but it occurs only in paroxysms, and is attended by a twisting sensation in the pelvis and lower part of the abdomen; or it recurs after intervals and resembles labour-pains. These pains usually precede for a shorter or longer period the discharge, which is extremely various as to amount and continuance. Sometimes the discharge comes on in gushes, with coagula, and recurs more or less frequently. These generally afford relief, at least for a time, the febrile symptoms subside, and the rest of the period is passed, as in the more healthy state. But, in more severe or protracted cases, after a shorter or longer remission, during which either a draining merely continues, or the discharge is in almost a natural state, an exacerbation, in a more or less severe form, takes place; and thus the complaint may return oftener than once, and be prolonged for seven or eight days or even much longer, especially if the patient attempts to keep about or to use any exertion. On examination per vaginam, the os uteri and cervix, sometimes with the vagina, are often discovered to be fuller, hotter, and more tender than natural. The discharge usually leaves the patient exhausted, and several days elapse before her usual health is restored. This form of the complaint may return during several successive periods, each of which may be so prolonged, that the intervals between them become greatly reduced, and the health remarkably impaired. In these cases, this active form passes into the next, or the passive state of the complaint.

113. *B. Passive or chronic hæmorrhagic menorrhagia* is generally gradual in its accession, unless when it is consequent upon the acute state. It is the most common form of the complaint; and affects chiefly delicate, hysterical, and debilitated females. It exists in various grades from the slightest increase of the menstrual discharge, to the most severe hæmorrhagic prostration. In some cases, the disease at first, or even for several periods, possesses the usual features of true menorrhagia. In other instances, one, two, or more coagula are observed at first upon the accession of the period, and then an intermission takes place. The discharge afterwards recurs more abundantly, and with larger or more numerous clots. It may be so abundant or continue so long as to occasion faintings and great exhaustion; the back being weak and aching, the countenance and lips pallid, the strength exhausted, and the pulse always becoming small, feeble, and quick. The constitutional symptoms and consequences of the malady already noticed (§ 110.) become urgent or even dangerous, if the discharge be not checked or arrested. The uterus, on examination, generally betrays no change.

114. *C. Congestive menorrhagia — Menorrhagia with change in the Uterus.* — This variety generally occurs after forty years of age, or about, or even after, the cessation of the menses. The discharge is generally more profuse, and its effects more severe in this than in the other varieties; and it takes place in all constitutions, temperaments, and habits of body. The attack is usually preceded for some time by irregularity of the menses, as to quantity and time, as well as to the duration of the periods; and uterine leucorrhœa has generally existed during the intervals. About twenty-four hours after the discharge has commenced, large clots are expelled, and the sanguineous flow becomes still more abundant. The attack lasts from six to ten days; but, in cases of longer standing, Dr. Churchill has occasionally known it to continue throughout the interval, and terminate after the next period either gradually or suddenly; but it may continue for several periods with remissions merely during the latter portion of the intervals. The quantity lost, in some instances, has been sufficient, in one attack, to excite fears of a fatal result. The discharge is encreased by standing or exertion, but it is not materially diminished by the recumbent posture. In addition to all the symptoms above noticed (§ 113.), which are occasioned by exhaustion and loss of blood, and which are still more rapidly and severely induced in this than in the preceding varieties, the patient complains of weight, dull pain, or bearing down in the pelvis. There is also occasionally dysuria; but more frequently irritation only extending to the urethra and neck of the bladder. The pulse is weak, small, sometimes quick; and the general

health remarkably impaired. On examination *per vaginam*, the os uteri is generally found low in the vagina, and is directed more backwards, and is more open, than in the healthy state. The cervix uteri is also more swollen, the body of the organ being thrown forwards so as to press upon the bladder. There is no increased heat of the cervix or vagina, but the former is slightly tender on pressure, and the body of the organ seems somewhat swollen.

115. iii. *Diagnosis.— A. As respects the Forms of the Complaint.— a.* The *first form* of the disorder is readily distinguished by the absence of coagula from the separation of the discharge into crassamentum and serum; when such separation takes place, the complaint is no longer true or simple menorrhagia, but one of the hæmorrhagic varieties. — *b.* Of these *varieties*, the *first* is distinguished by slight fever, pain in the region of the uterus, or spasms in this region and in the abdomen, by slight heat and tenderness of the os uteri, and by the other circumstances of its occurrence as pointed out above (§ 112.). — *c.* The *second* of these is not attended by fever or by heat or tenderness of the os uteri; but coagula are voided, and the parts are generally soft or relaxed; nervous, debilitated, and hysterical females being generally affected, and anæmia being either present or soon supervening. — *d.* The *third* or congestive variety is characterised by the state and position of the *cervix* and *os uteri* (§ 114.), especially by fulness of the former and openness of the latter, and by the class of patients in which it most commonly occurs.

116. *B. Menorrhagia* may be mistaken for early abortion, or for organic disease of the uterus. — *a. Approaching abortion* may be confounded with hæmorrhagic menorrhagia until the ovum is expelled or detected; the paroxysms of pain, or recurrence of spasms, attending the spasmodic or inflammatory state of menorrhagia, resembling the pains of abortion. The retention of a blighted or of a detached ovum often gives rise to hæmorrhage, which may be mistaken for menorrhagia; and the retention with its consequences may continue for weeks or even for months, and yet nothing more may be detected on examination beyond greater fulness of the cervix, and more openness, than usual, of the os uteri. In these the history of the case, the continuance and symptoms of the complaint, and the effects produced by the discharge, will suggest its probable cause; and the adoption of the means about to be recommended will disclose the nature of, as well as terminate, the mischief. I have been consulted in several cases similar to the following: — The wife of a friend had passed the usual menstrual period a few days when she was attacked by pains, of a spasmodic nature, in the region of the uterus, followed by menorrhagia, which subsided upon assuming the recumbent posture. The discharge recurred, sometimes in gushes, after more or less marked remissions, being generally preceded by pain. Cupping, leeches, anodynes, &c. were prescribed by the surgeon, who usually attended her during her confinements. The discharge continued, and the consequences becoming serious, I was requested to see her. The ergot of rye was prescribed with the biborate of soda, an early ovum was expelled, and the recovery was afterwards rapid. The active form of hæmorrhagic menorrhagia very closely approximates to inflammatory determination to, or even to inflammation of, the uterus; and is to be distinguished from it by the severity and continuance of the pain, and by general fever being greater in the latter, the discharge preventing the former from passing into an acute state of inflammation.

117. *b.* The difficulty of distinguishing between hæmorrhagic menorrhagia and hæmorrhage caused by organic disease of the uterus, is often very great. In these latter the hæmorrhage is irregular, and occurs at any time, and without regard to the menstrual period, when it takes place so early in life; it is, moreover, attended by more pain than menorrhagia, and by various constitutional indications of malignant or other structural change. Corroding ulcer or cauliform excrescence of the os uteri, polypus when it has descended even partially, and ulcerated cancer of the cervix, are readily recognised on examination, when they occasion frequently recurring or protracted hæmorrhage; but whether the discharge is caused by uterine congestion and relaxation merely, or by a polypus retained in the uterine cavity, or by a sub-mucous tumour, or by organic change of the mucous lining itself, is difficult to determine. A favourable diagnosis depends on the natural state of the uterus as far as may be determined by examination, on the absence of great emaciation, on the diminution of the hæmorrhage from treatment, on the general concurrence of the discharge with the menstrual periods, on the states of the cervix and os uteri during the intervals, and on the appearances of the countenance. A strumous constitution, as Dr. ASHWELL remarks, glandular tumours in other parts, hard tumours of the fundus or body of the uterus, broad ligaments or ovaries, increasing hæmorrhages and uterine pain, a gradual deterioration of the constitution, and the inefficacy of remedies indicate the dependence of the discharge upon organic lesion, and an unfavourable termination.

118. iv. The *prognosis* depends upon the evidence furnished as to the existence or non-existence of organic lesion. As long as the complaint presents either of the forms of menorrhagia above described, the menstrual periods being observed, if the intervals or remissions are marked accordingly, if there be no sensible change in the uterus, if the lungs are unaffected, and the general health not remarkably impaired, a favourable prognosis may be given. The *first* variety, and active form of the *second*, are more readily removed than the other states of the complaint. The slighter cases of these may even cease spontaneously; but the congestive form is generally more obstinate and severe. In the severer cases, *pregnancy* does not take place; but in the milder cases it may. When the disease assumes a more severe, chronic, and continued form, causing anæmia, nervous affections, and the more serious consequences, above alluded to (§§ 110. 113.), it is not altogether devoid of danger, and a guarded prognosis then is requisite. The circumstance of menorrhagia, when neglected or unsuccessfully treated, being not infrequently a cause of pulmonary disease, should not be overlooked.

119. v. *Causes.— a.* The *predisposing causes* of menorrhagia are, the hæmorrhagic diathesis and hereditary predisposition, the earliest and latest periods of the menstrual epoch, a delicate or de-

bilitated constitution, general or local vascular fulness, and excitability of the uterine system. Several causes both *predispose* to, and directly *excite* the complaint, particularly venereal excesses, masturbation; prolonged or too frequent suckling; leucorrhœa; indolence, rich living, and hot beds; spirituous and other liquors used in excess; frequent child-bearing and abortions.

120. *b.* The other *exciting causes* are local injuries, falls, concussions of the trunk and pelvis as when falling on the hips; the use of irritating and exciting purgatives, particularly calomel, aloes, and colocynth; constipation of the bowels; the irritation of worms in the intestines; physical efforts, as lifting heavy weights; exposures to cold, and mental excitement and moral emotions. It is very manifest that these and other influences will often directly or indirectly occasion increased vascular action in the uterus, or produce increased fulness of, or flow of blood into, the uterine vessels, although the vascular system may not be plethoric, or even may actually be deficient in its due supply of blood. In many instances, the sanguineous discharge proves a natural relief to the organ, which, without such relief, may have become the seat of very acute inflammatory action.

121. vi. *Treatment.*—*A.* The treatment of the *first variety*, or true menorrhagia, should depend much upon the *habit of body* of the patient, *the period* at which it is prescribed, and upon *the causes* of the complaint. The causes should be ascertained, and removed, as far as this may be done. —*a.* When the patient is robust or plethoric, a copious discharge is often salutary, and should not be prematurely interfered with, or should be allowed to proceed until it ceases spontaneously. Most writers advise general and local bloodletting, cupping on the loins or sacrum, &c., and, in some cases, these depletions are both indicated and beneficial, but they are as often unnecessary, and in a few instances they have proved injurious, by suddenly arresting the discharge, which has not returned again in a regular or healthy form; or by giving rise to various hysterical affections, particularly when the states of general or of local plethora have not been such as to require them. In some cases, dry-cupping on the loins, or the application of leeches around the anus, is more appropriate and beneficial than these measures.

122. *b.* When the discharge is really excessive, especially in respect of the state of the patient, and in the *delicate*, *pallid*, and *hysterical*, the patient should maintain the recumbent posture on a sofa or mattrass, be restricted to a spare diet and cooling regimen, and take cooling astringents, as the infusion of roses with sulphuric acid, or the infusion of cinchona or other astringent infusions with nitre. If the bowels be confined, the supertartrate or tartrate of potash may be given with the preparations of senna, or the sulphate or bisulphate of potash in the infusion of roses. In other circumstances, the acetate of lead with the acetate of morphia, or the sulphate of zinc, with opium; or camphor and ipecacuanha with opium; or repeated doses of Dover's powder, will be prescribed with advantage. The ergot of rye has been very generally recommended in menorrhagia. Dr. Churchill, Dr. Ashwell, and others, advise it in this form of menorrhagia in doses of about five grains, three times a day. It is often efficacious, but less frequently so in this, than in the hæmorrhagic forms of the complaint. Cold sponging the loins, abdomen and hips, and cold enemata, may be employed; but injections of cold, astringent fluids into the vagina, as directed by Dewees and some French physicians, are not unattended by hazard, especially in suddenly checking the discharge, and thereby risking the occurrence of inflammation and internal effusion. Plugging the vagina, as advised by some writers, or an enema containing a scruple of the acetate of lead, as prescribed by Dr. Macintosh, is rarely requisite in this variety of the complaint.

123. *c.* In the *intervals* between the periods, strict reference should be had to the state of the patient. For the *plethoric* and robust, a spare and cooling diet, the bowels being kept open by means of the aperients above recommended (§ 122.), regular exercise in the open air, early rising, and the avoidance of heating beverages and of too warm apartments, or too soft and warm beds, of full living, luxurious indulgences, and of the predisposing and exciting causes, are especially required.

124. *d.* For the *pallid* and *delicate*, different means are necessary. To this class of patients, the chalybeates, particularly the tincture of the sesquichloride of iron, or the sulphate of iron with quinine and sulphuric acid, are especially appropriate. The chalybeate mineral waters, residence near the sea, or in a dry and airy situation, sponging the loins daily with cold salt water, or with a solution of bay-salt; salt water bathing, or the cold shower-bath; avoidance of the causes, as prolonged or excessive suckling; abstaining from, or moderation in, sexual intercourse; the use of enemata of cold water; and a light nutritious diet, with attention to the state of the bowels, are also requisite. Wine may be taken in small quantity; and the extremities and surface should be kept moderately warm, but too much clothing around the loins and hips is injurious.

125. *B.* The *second* or *hæmorrhagic variety* of the complaint should be treated on the same principles as have been stated above.—*a.* During the *acute* or *inflammatory form of the attack*, bleeding, general or local, or both, is more appropriate than in simple menorrhagia. This form of the complaint, as I have remarked, approaches to metritis, into which it would readily pass if the discharge did not occasion a resolution of the morbidly increased vascular action in, or determination to, the womb. The cases, however, are comparatively few, in which the disease nearly reaches this state; but in these, depletions, according to the state of the pulse; cooling aperients and diaphoretics; the preparations of antimony conjoined with sedatives; the acetate of lead with acetate of morphia; ipecacuanha with opium, or Dover's powder, are principally indicated. Dr. Ashwell states, that Dr. Cholmely prescribed drastic purges for all cases of acute hæmorrhagic menorrhagia that came under his care in Guy's Hospital—a practice doubtless attended by success in the great majority of instances, owing to its derivative operation; but, if these purgatives had acted much on the lower bowels, the uterus may have participated in the irritation and consequent vascular determination.

126. When the acute form of hæmorrhagic menorrhagia is attended by much *pain* or *spasm*, or by recurrences, or by exacerbations of either of these, ipecacuanha with opium, in frequent doses;

digitalis with camphor and belladonna, and a plaster applied over the sacrum containing the extract of belladonna, are generally beneficial. If there be any reason to infer that the discharge and pain are perpetuated by the retention of an early detached or blighted ovum, the biborate of soda may be given in solution either alone or with the tincture or powder of the ergot; or an enema may be administered containing the spirits of turpentine and the extract or confection of rue; and an epithem or embrocation with turpentine, or with some one of the liniments in the *Appendix* (F. 297. 311.), may be placed over the hypogastrium. In these cases, about half an ounce of turpentine may be taken by the mouth, with an equal quantity of castor oil, either on the surface of milk or in any suitable vehicle, and may even be repeated, particularly when the discharge continues, or resists the other means which have been here advised; the enema just prescribed being also repeated in these circumstances.

127. During the intervals, the treatment of this form of hæmorrhagic menorrhagia should be in no respects different from that advised for simple menorrhagia in plethoric habits. In many cases, it should be conducted with the conviction, that more or less local congestion or vascular determination continues during the interval; and, consequently, a cooling regimen, spare diet, occasional local depletions, refrigerants, cooling aperients, and avoidance of the causes, should be recommended.

128. *b.* The *passive* or *chronic state* of hæmorrhagic menorrhagia should be treated, when the disease is not severe, nearly as advised for simple menorrhagia occurring in delicate females. In this state of the complaint the ergot is especially useful, and it may be conjoined with the biborate of soda; or the latter may be given with vegetable tonics, astringents, and aromatics. In the more severe or obstinate cases, the means just advised (§ 126.), or those prescribed for HÆMORRHAGE FROM THE UTERUS (247. *et seq.*), must be resorted to. The cold douche on the loins and hips; cold astringent enemata, or terebinthinate enemata; terebinthinate epithems, or embrocations on the hypogastrium; the recumbent posture and perfect quietude are also beneficial. Dr. BLUNDELL resorts "to the injection of astringents, not into the vagina only, but into the uterus itself," in cases where the bleeding goes on until the patient is reduced to extreme weakness. In these, the more astringent tonics and mineral acids, the tinctura ferri sesquichloridi, with tinctura lyttæ, in the infusion of quassia or calumba; the bi-sulphate of potash in the infusion of roses, with tincture of henbane, when the bowels are confined; and, subsequently, the vinum ferri, or other chalybeates, a moderate use of wine and light nutritious food, residence on the sea-coast, or in a dry air, and the use of the mineral waters recommended for convalescence from HÆMORRHAGE (§ 251.), and the other means advised above (§ 123.), during the intervals of simple menorrhagia, are generally appropriate.

129. *c.* The *third form* of hæmorrhagic menorrhagia requires but slight modifications, if any, of the treatment already stated. Previous to the recurrence or exacerbation of an attack, and when there is evidence of local congestion, the system not being much reduced, cupping on the loins, or leeches in the vicinity of the anus may be prescribed; the causes of the complaint, particularly local excitements, sexual intercourse, &c., being avoided. In this state of disorder tonic astringents are required, even at the time when local depletions are indicated; and when these latter should not be resorted to, dry cupping on the loins may be directed. In this form, as well as in the preceding, the ergot of rye will generally prove efficacious; and the several means just recommended for passive menorrhagia (§ 128.) will also be of service in this. If the cervix or body of the uterus be enlarged, the preparations of iodine, especially the iodide of iron or of mercury, or the iodide of potassium and liquor potassæ, the iodide and other preparations of arsenic, and blisters repeatedly applied over the sacrum, or kept open for some time, or other counter-irritants in the same situation, will generally prove beneficial. The other means already directed for the preceding states of menorrhagia, during the period and intervals, may also be resorted to in this, more particularly the astringent and terebinthinate enemata, and terebinthinate epithems applied over the hypogastrium. If this form of menorrhagia be dependent upon organic change in the uterus, the treatment should be mainly directed to such change. (See art. UTERUS.). When menorrhagia assumes those severe and even extreme forms which are truly hæmorrhagic, the observations which have been made at due length on the *pathology and treatment of hæmorrhagia from the uterus*, are altogether applicable to it. (See art. HÆMORRHAGE, § 220, *et seq.*)

VI. OF CERTAIN IRREGULARITIES OF MENSTRUATION NOT COMPRISED UNDER THE FOREGOING HEADS.

130. I have elsewhere stated that menstruation may take place *prematurely*, and that when the discharge appears irregularly, or only occasionally at an earlier age than that which has been assigned above to the commencement of the menstrual epoch, it should be often viewed as hæmorrhage from the uterus or genitals, rather than early menstruation. On this subject I shall, therefore, add nothing at this place to what I have said in the article HÆMORRHAGE (see § 222.).

131. i. *Irregular Menstruation and its Complications.*—*A.* In some instances the menses are *premature*, but they afterwards cease, and again recur, sometimes profusely, after *irregular* and *prolonged periods*. In other cases they are *delayed*, then appear for a few periods, either *scantily* or *profusely*, and thus return after irregular or prolonged intervals. In many cases, these irregular states are *complicated with leucorrhœa*, and if this association be allowed to proceed, *chlorosis* or *tubercular disease of the lungs* may supervene, and place the life of the patient in the greatest jeopardy. They may also occur in connection with *chorea*, especially scanty and irregular menstruation, but not so often as *delayed menstruation*, which generally exists when chorea continues up to puberty. In young females, particularly in the scrofulous and delicate, these irregularities, especially when they are connected with delayed menstruation, are sometimes *associated with enlargement or chronic inflammation of the lymphatic, parotid, and sub-maxillary glands.* I have been consulted in several instances on account of glandular enlargement in various situations, particularly of the

glands just mentioned, which had commenced about the period of puberty; and in all these the catamenia had been delayed, or had appeared scantily, and at long intervals. These cases occur chiefly in large boarding-schools, where too many sleep in one apartment, and where due exercise in the open air is neglected. They are frequent also in factories, in which females about the period of incipient puberty are employed. At this period, and also in connection with delayed or scanty menstruation, the slighter forms of *goitre* are not infrequent, especially where this latter disease is endemic.

132. These irregularities, as to the time and abundance of the catamenia, are often also associated with the earlier periods of *tubercular consumption*, with general *cachexia*, and with the slighter forms of *chlorosis;* complete amenorrhœa more frequently accompanying the advanced state of this latter complaint. In these cases, tubercular disease of the lungs is a frequent termination of the malady.

133. *B. Treatment.* — For these *irregular* and *complicated* states of menstruation, there is no remedy so much to be depended upon as *iodine*, in judicious combinations, particularly when aided by change of air, residence on the sea-coast, salt-water bathing, chalybeate mineral waters, and walking exercise, or riding on horse-back. The iodine may be combined with *iron*, the liquor potassæ, or other substances, according to the features of the case. The preparations of iron, particularly the mistura ferri composita, and emmenagogue and stomachic purgatives, are also indicated. If *leucorrhœa* exist, the means advised for that complaint may be prescribed, or the above treatment varied accordingly. In the summer of 1826, I was requested by Mr. Annesley to see Miss C., aged sixteen years, who had the parotids, sub-maxillary glands, and the lymphatic glands in the neck, near the clavicles, and in the axilla remarkably enlarged, and in a state of chronic inflammation; the integuments, however, had not become discoloured: the catamenia had not appeared. I advised a course of iodine in combination with liquor potassæ, and afterwards with iron, and persistence in the use of these for some months in small or moderate doses, the catamenia appeared at first scantily and irregularly, and the glandular disease gradually disappeared without proceeding to suppuration. Several cases of a similar description have occurred to me in the circumstances alluded to. These several forms of scanty and irregular menstruation, especially those with prolonged intervals between the periods, require much the same treatment as was advised for amenorrhœa in delicate constitutions (§ 32—38.).

134. ii. *Offensive or otherwise morbid catamenia* are occasionally observed; and especially in the same circumstances as I have mentioned in connection with the production of the foregoing irregularity. — *A.* The discharge may not only be very offensive, but also discoloured and remarkably irritating to the parts with which it comes in contact. I was many years ago called to a young lady, about seventeen years of age, in a boarding-school, who was suffering in a distressing manner in consequence of the irritating and offensive state of the catamenia. There had been no retention of the discharge, but it was so irritating as to inflame the vagina, the labia, and insides of the thighs; severe erythema extending along the limbs and for a considerable distance over the hips, and confining her for several days to bed. She had suffered in a much less severe manner in some of the preceding menstrual periods. I have since met with instances of this state of the catamenia being complicated, or otherwise connected, with *erysipelas.* These conditions did not appear to have been caused by retention of the discharge in the vagina, as no obstruction existed, and there was no other symptom of menstrual disorder. Dr. Blundell, however, makes mention of partial closing of the orifice of the vagina, as being, in rare instances, a cause of offensive catamenia. In the cases to which I have here directed attention, the catamenia are offensive, owing, generally, at least as I have observed, to constitutional disorder, or to a morbid state of the circulating fluids, in connection with impaired action of the principal organs of depuration. Besides this state, in which the discharge is generally also very dark, black, or pitchy, or greenish-black and very offensive, and besides the presence in it of membranous exudations, as described above (§ 84.), it sometimes is grumous, at other times pale, or serous. These conditions of the menstrual discharge may be preceded or followed by leucorrhœa, or be associated with general cachexia, or connected with erysipelas. In one case, this offensive and pitchy condition of the menses proved critical at an early period of erysipelas in the face, in a female of eighteen years of age.

135. *B.* The *treatment* of these states of disordered menstruation, depends much upon the affections with which they are associated. In most of those which I have observed, the functions of the liver, bowels, and skin, were impaired; and the patients were placed in unfavourable circumstances in respect of air and exercise, and had neglected the state of their bowels. In these, stomachic purgatives, tonics with alkalies, emmenagogues and alteratives, were prescribed with complete success; and were continued during the intervals of indisposition, aided by change of air, exercise, the use of alkaline or chalybeate mineral waters, sea-bathing, &c. In these cases, attention to the state of the general health, and to the assimilating and excreting functions, is the chief indication of cure. The articles on Catalepsy and Ecstasy, Chlorosis, Chorea, Hæmorrhage from the Uterus, Hysteric Affections, Leucorrhœa, Ovaria, and Uterus, may be consulted in connection with disordered Menstruation.

Bibliog. and Refer. — *Hippocrates*, Aphorismata, sect. v. n. 33.; et γυναικειων, Opera, p. 590. — *Aretæus*, l. ii. cap. 2. — *Galenus*, De Locis Affect. l. vi. cap. 5. — *Moschion*, De Morbis Mulierum, l. ii. c. 2. — *Aëtius*, Terab. l. iv. sect. iv. cap. 63. — *Avicenna*, Canon. l. iii. fen. 21. tr. 3. cap. 25. — *Bovius*, Flagello contro di Medici, Venet. 1585; in *Haller*, Biblioth. Med. Pr. vol. ii. p. 246. (*Hellebore, in Suppr. Mens.*) — *J. Sylvius*, De Mensibus Muliebribus, 4to. Argent. 1597. — *R. A. Castro*, De Morbis Mulierum, l. i. c. 2. Hamb. 4to. 1603. — *J. Varandæus*, De Morbis Mul. et Suppressione Mensium, 8vo. Hannov. 1619. — *Salmuth*, Observ. cent. iii. ob. 36. — *J. Primerose*, De Mulierum Morbis, l. i. c. 5, 6, 7. 8vo. Rot. 1655. — *Amatus Lusitanus*, cent. ii. cur. 17. 21. — *Benivenius*, De abditis Morborum Causis, cap. 41. — *Sennertus*, Pract. l. iv. p. iii. s. 2. 5. — *Zacutus Lusitanus*, Prac. Hist. l. iii. ob. 10.; l. ix. ob. 4, 5. — *Mercatus*, De Morb. Mulierum, l. i. c. 11. — *Bartholinus*, Hist. Anat. cent. i. 13.; cent. v. 32.; et Acta Haun. vol. i. 81.; vol. ii. 34.; vol. v. 74. — *Schurig*, Hæmatalogia, p. 271.; et Gynæcologia, p. 131. — *J. Friend*, Emmenologia, 8vo. Oxf. 1703. — *Bonet*, Sepulchretum, l. iii. sect. 35. ob. 2. — *G. E. Stahl*, in *Halleri* Dissert. ad Med. Pract. t. iv. — *Boerhaave*, Praxis Med. pars v. p. 218. — *T. Simson*, The

System of the Womb, with an Account of the Menses, &c. 8vo. Edin. 1729. — *Blankard*, Collect. Med. Phys. cent. iv. No. 9. — *Le Tellier*, Critical Reflect. on *Dr. Friend's* Emmenology; trans. from the French, 8vo. Lond. 1731. — *J. L. Regemann*, De Morbis ex Menstruis cessantibus, 4to. Lugd. Bat. 1737. — *R. Emmett*, Tentamina Medica de Mensium Fluxu, &c. 12mo. Lond. 1752. — *J. Astruc*, Traité des Maladies des Femmes, t. i. 12mo. Paris, 1761. — *Morgagni*, De Sed. et Causis Morborum, Ep. xlvii. art. 2. 5. — *Triller*, Opuscula Med. vol. i. *passim*, Franc. 4to. 1766. — *Linnæus*, In Amœnit. Acad. Upsal. vol. viii. p. 237. (*Marum cum Ferro in Suppr. Mens.*) — *J. Stedman*, Physiolog. Essays and Observat. 8vo. Edin. 1769. — *Walter*, in Nouv. Mém. de Berlin, ann. 1774, p. 81. — *De Haen*, Rat. Méd. p. vi. c. 2. — *Magnan*, in Hist. de la Société Royale de Médecine, 1776, p. 286. — *Rathieu*, in ibid. 1777, p. 78. — *J. Birch*, Considerations on the Efficacy of Electricity in removing Female Obstructions, 8vo. Lond. 1779. — *A. Pasta*, Sopra è Menstrui delle Donne, 8vo. Napoli, 1782. — *Brandis*, Versuch ueber die Metastasen, p. 163. — *Friar*, Med. Facts and Observat. vol. viii. — *J. Leake*, Medical Instructions towards the Prevention and Cure of Chronic or slow Diseases peculiar to Women, 2d edit. p. 43, *et seq*. Lond. 1787. — *Boyer*, Mém. de l'Acad. des Sciences, ann. 1771. — *Fothergill*, in Med. Observat. and Inquiries, vol. v. p. 184. — *Sherween*, in Ed. Med. Comment. vol. ii. — *Adair*, in ibid. vol. x. p. 47. — *De Meza*, in ibid. vol. xii. p. 380. ; et in Acta Reg. Soc. Med. Havn. vol. iii. p. 289. 370. — *Marinelli*, Medecine all'Infirmità delle Donne, l. ii. cap. 17. — *Whytt*, Works, &c. p. 520. — *Krebs*, Medicin. Beobachtungung, b. ii. st. iv. No. 2. — *Home*, Clinical Experim. &c. p. 377. — *Pearce*, in Mem. of Med. Soc. of London, vol. iii. Append. No. 3. — *Conradi*, Handb. der Pathol. Anat. p. 339. ; et in *Hufeland*, Journ. der Pract. Arzeyk. b. vi. p. 496. — *Gebel*, in ibid. b. vii. st. 3. p. 177. — *Starke*, Klinisches Institut. p. 51. — *Thomann*, De Fluxu Menstruo Naturali ejus Retentione, 8vo. Wurz. 1797 ; et Annales Wurceburg, vol. i. p. 206. — *Aldini*, Essai sur le Galvanisme, &c. p. iii. — *J. M. J. Vigarous*, Cours élémentaire de Maladies des Femmes, et Essai sur nouvelle Méthode pour étudier et pour classer les Maladies de ce Sexe, t. i. p. 74, *et seq*. Paris, 2 tomes, 1801. — *J. P. Frank*, De curandis Hominum Morbis, l. v. ; De Profluviis, pars ii. ; l vi. De Retentionibus, pars iii. p. 101. — *P. A. Beclard*, sur les Maladies des Femmes, à l'Epoque de la Cessation des Menstrues, 8vo. Paris, 1802. — *A. Royer-Collard*, Essai sur l'Amenorrhée, 8vo. Paris, 1802 ; et Dict. des Sc. Méd. t. i. — *A. Fogg*, Observat. on the Uterine Discharge, Amenorrhœa, &c. 8vo. Newcast. 1803. — *Osthoff*, Untersuchungen ueber die Anomalen der Monatlichen Reinigung, 8vo. Lemg. 1804. — *Portal*, Cours d'Anat. Médicale, t. iii. p. 170. ; t. v. p. 537. — *Oberteuffer*, in *Stark's* N. Archiv. b. ii. p. 637. — *Osiander*, Denkwürdigheiten, b. ii. p. 183. — *Bischoff*, in *Hufeland*, Journ. der Pract. Heilk. b. xiii. st. 4. p. 117. *Ritter*, in ibid. b. xvii. st. 3. p. 37. — *Reil*, Mémorab. Clinica, fasc. iii. p. 206. — *Martin Wall*, in Trans. of Med. and Chirurg. Soc. vol. ii. — *Horn*, Archiv. der Practischen Heilk. für Schlesien, b. iii. st. 1. — *C. Hohnbaum*, Ueber eine Besondere Art des uebermässigen Monatflusses, 8vo. Erl. 1811. — *J. A. Pitschaft*, Unterricht ueber Weibliche Epoche, 8vo. Heidl. 1812 — *Joerg*, Krankheiten des Weibes, p. 136. — *Capuron*, Malad. des Femmes, t. iii. p. 120. — *Siebold*, Francuzimmerkrankheiten, b. i. p. 339. — *D. Stewart*, A Treatise on Uterine Hæmorrhage, 8vo. Lond. 1816. — *Maygrier*, in Dict. des Sciences Méd. t. xxxii. p. 375. — *P. A. Surun*, Théorie de la Menstruation, 8vo. Paris, 1819. — *Zuccari*, in Révue Médicale, t. ii. p. 292. 1824. — *Goupil*, in ibid. t. i. p. 455. 1825 (*Nit. Potassæ in very large doses in Menorrhagia.*) — *Desormeaux*, in Dict. de Médecine, t. i. p. 166. ; t. xiv. p. 175. — *J. Hamilton*, Outlines of Midwifery, p. 152. Edin. 1826. — *Berndt*, Encyclop. Wörterb. b. ii. — *Bonfils*, Archives Générales de Méd. t. xix. p. 112. — *Porta*, in ibid. t. xiv. p. 427. (*Tannin in Menorrhagia.*) — *Cavalier*, in ibid. t. xix. p. 589. — *J. Osborne*, in Trans. of Irish Coll. of Phys. t. v. p. 18. (*Ipecacuanha Emetics in Menorrhagia.*) — *Roche*, Dict. de Méd. Prat. t. i. — *Dugés*, in ibid. t. xi. — *W. P. Dewees*, in Medico-Chirurg. Review, vol. i. p. 495. ; and Treatise on the Diseases of Females, p. 44, *et seq*. Philad. 1828. — *Roberton*, in Edin. Med. and Surg. Journ. vol. xxxviii. p. 277. — *Loudon*, in ibid. vol. xxxviii. p. 61. — *Bardsley*, Hosp. Reports, p. 51. — *M. Hall*, Comment on some Important Dis. of Females, p. 1, *et seq*. 8vo. Lond. 1827. — *Le Beau*, American Journ. of Med. Sciences, Nov. 1832. — *Hooper*, On the Morbid Anat. of the Uterus, Lond. 1832, pl. i. fig. 2. — *F. Duparcque*, Traité Théor. et Pratique sur les Alterations Simples et Cancer. de la Matrice, p. 21. Paris, 1839. — *Nauche*, Maladies propres aux Femmes, &c. vol. ii. p. 646. — *Locock*, Cyclop. of Pract. Méd. vol. i. p. 67. 661. ; vol. iii. p. 105. 110. — *Petrequin*, in Med. and Chirurg. Rev. vol. xxix. p. 605. — *A. B. Granville*, Graphic Illustr. of Abortion and of the Dis. of Menstruation, &c. 4to. Lond. 1833. — *Amussat*, Gazette Médicale, Dec. 1835. — *Macintosh*, Pract. of Phys., vol. ii. p. 425. — *O'Reilly*, in Dublin Journ. of Med. Sciences, vol. vi. p. 318. — *F. Churchill*, Outlines of the principal Dis. of Females, p. 60, *et seq*. Dublin, 1838. — *B. Riofrey*, Treatise on Physical Education, especially adapted to young Ladies, 2d edit. 8vo. Lond. 1838. — *J. Balbirnie*, On the Diagnosis and Treatment of Organic Diseases of the Womb, p. 77. 8vo. Lond. 1836. — *Waller*, On the Funct. and Dis. of the Unimpregnated Uterus, 8vo. Lond. 1840. — *S. Ashwell*, Pract. Treatise on the Dis. peculiar to Women, part i. p. 55. *et seq*. Lond. 1840. — *Ferguson*, in Library of Pract. Med. vol. iv. p. 300.

MENTAGRA. See Sycosis.

MESENTERY AND ITS GLANDS.—That portion of the *peritoneum* forming the *mesentery* is less frequently the seat of disease than that which is reflected over the digestive canal and other viscera, more especially of inflammatory diseases and their consequences. The *mesenteric* or *lacteal glands* are liable to the same changes as the *lymphatic glands*; but the diseases of the former are generally more dangerous in their consequences than those of the latter. As the mesentery and its glands are portions only of two kinds of structure which are fully discussed in other articles, I shall consider only those changes of them, which, owing to their pathological relations, and to the phenomena they occasion, require a special notice.

I. Mesentery — Inflammations of. — Synon. *Mesenteritis*; *Mesenterite*, Fr.; *die Gekrösenentzündung*, Germ.

Classif. — III. Class, I. Order (*Author*).

2. Defin. — *Pain, deep-seated, and extending from the spine to the umbilicus, increased by pressure, cough, &c., attended by symptomatic fever.*

3. i. *Symptoms and Diagnosis.* — The existence of mesenteritis is determined with great difficulty; for, as Frank observes, it is seldom observed in an uncomplicated form, but generally associated with enteritis. It also sometimes is complicated with peritonitis, nephritis, or even with pancreatitis; and it generally escapes detection until disclosed by post mortem examinations. Mesenteritis very rarely occurs in an *acute*, *primary*, and *simple form*; but more frequently in a *chronic*, *secondary*, and *complicated* state. — *A.* The *acute form* of the disease is indicated by a constant deep-seated pain; extending to the spine and umbilicus; increased by cough, sudden motion of the trunk, by sneezing, and pressure; and attended by a sense of heat, by constipation, vomiting, and by fulness and hardness of the abdomen. In some instances, the hardness is unequal, and occasionally ischuria is present, particularly in children. The accompanying fever is generally inflammatory.

4. *B.* The *chronic state* of mesenteritis is not infrequent, either in a simple or tubercular form; but is usually *consequent* upon, or *complicated* with, scrofulous inflammation or enlargement of the mesenteric glands, with chronic peritonitis or pancreatitis, or with other diseases of adjoining viscera. In its tubercular form it is always associated with tubercular peritonitis, of which it is merely an extension. It is hence hardly or never to be distinguished from those maladies, even when most prominently marked, or is very rarely suspected to exist until disclosed by a post mortem examination; and its symptoms are even more obscure than those of the acute, the obscurity being great in proportion to the complexity and prolonged duration of the disease.

5. *C.* Chronic as well as acute mesenteritis

is met with chiefly in children of a strumous diathesis, and is *caused* by the maladies already noticed, by chronic dysentery, by diseases of the spinal column, by inflammation of the psoæ muscles, by enteritis, and by aneurisms of the aorta. The predisposing and exciting causes of both the acute and chronic forms are, therefore, those which commonly occasion those maladies, particularly *peritonitis.*

6. *D.* The *consequences* of mesenteritis are enlargement, inflammation, or induration of the chyliferous glands; albuminous exudations on, and adhesions of, the opposite surfaces; effusions of serous, or sero-albuminous, or sero-puriform matters from the inflamed surface; purulent collections between the laminæ of the peritoneum forming the mesentery, and the other lesions described in the article PERITONEUM.

7. ii. The *treatment* of mesenteritis is the same as that advised for *peritonitis,* due regard being had to the activity or form of the disease, the causes which produced it, and the constitution of the patient, especially the scrofulous, when that is clearly evinced (see art. PERITONEUM).

II. DISEASE OF THE GLANDS OF THE MESENTERY. — SYNON. *Mesenteric Disease; Tabes Mesenterica; Mesenteritis Chronica; Marasmus,* Auctorum. *Atrophia Mesenterica, Atr. Infantilis,* Hoffmann. *Febris Hectica Infantum,* Sydenham. *Scrofula Mesenterica,* Sauvages. *Pædatrophia Glandularis,* Swediaur. *Tabes Scrofulosa,* Cullen. *Parabysma Mesentericum,* Good. *Physconia Mesenterica,* Beaumes and Sauvages. *Marasmus Infantilis; Tabes Infantum; T. Atrophica; Pædatrophia,* Auct. var. *Carreau, Atrophie Mésentérique, Entero-Mésentérique,* Fr. *Darrsucht der Kinder; Geröschwindsucht, Atrophie der Kinder,* Germ. *Atrofia,* Ital. *Mesenteric Decline; Atrophy; Mesenteric Fever; Tubercles of the Mesentery.*

CLASSIF. — IV. CLASS, I. ORDER (*Author*).

8. DEFIN. *Distended and enlarged abdomen; emaciation gradually increasing; irregular and otherwise disordered bowels, and ultimately hectic fever, from enlargement and disease of the mesenteric glands.*

9. Of the numerous designations imposed on the malady about to be considered, *tabes mesenterica, disease of the glands of the mesentery,* and *marasmus or atrophy from diseased mesenteric glands,* are the most generally applicable. SAUVAGES, and recently Dr. JOY, have considered *scrofula mesenterica* to be most appropriate; but, although enlargement or other disease of the mesenteric glands occurs most frequently in scrofulous constitutions, it is not confined to them. The appellation, *infantile,* is equally objectionable; for, although the disease is most common in children, the disease is not confined to them, or to any age. The term *entero-mésentérique* has been applied to it, on the supposition, that the affection of the glands is always consequent upon, or connected with, irritation or disease of the mucous surface of the intestines. Doubtless such is the case in the great majority of instances, but not universally; for, as in the lymphatic glands in various situations, especially as observed in scrofulous constitutions, so in the mesenteric glands, disease may occur primarily and independently of inflammation or irritation in parts related to them.

10. i. ACUTE DISEASE OF THE MESENTERIC GLANDS. — An acute form of disease of the mesenteric glands has been observed but rarely or never unconnected with some other disease, particularly *fever* and *dysentery.* BAGLIVI noticed this connection in the fevers occurring in Rome; and MM. PETIT and SERRES described the association as they observed it in the fever which was epidemic in Paris during 1811, 1812, and 1813. Still more recently MM. CHOMEL, LOUIS, ANDRAL, and CRUVEILHIER, have noticed an inflammatory, or rather a congested and enlarged state of these glands, in many cases of fever, when the internal surface of the bowels was inflamed or ulcerated. I have seen the same association of disease in adynamic fevers, both in temperate and in tropical climates, and not only in these fevers, but also in dysentery. That the affection of the mesenteric glands is merely a complication contingent upon irritation of the intestinal mucous surface and glands in these maladies, and is much more frequently met with in some epidemics, and in certain localities, than in others, cannot be disputed; but it has no claims to be considered as a "simple acute inflammation of the mesenteric glands," as some authors have considered it; for it occurs chiefly in connection with marked asthenia or depression of the powers of life; and is indicated merely by enlargement and increased vascularity — changes consequent upon irritation or congestion more frequently than upon actual inflammation.

11. Acute disease of the mesenteric glands can therefore be viewed only as *consecutive* or *symptomatic,* chiefly of the maladies just mentioned. As a primary affection I have had no knowledge of it, and, as such, I believe it rarely to exist. In its symptomatic states I have observed it often, both in children and in adults, but in the former most frequently, and only in post-mortem examinations. Although there are numerous circumstances which have induced me to infer that the mesenteric glands had become affected in the course of dysentery and the enteric form of continued or remittent fever, yet there are no symptoms by which its existence can be known with any certainty. When we observe these diseases affecting the strumous diathesis, and persons residing in low, humid, or crowded and unhealthy localities, and in ill-ventilated streets and apartments, particularly children so circumstanced; when the stools are irregular, lienteric, or chalky, or yeasty, very light, or variously coloured; and when the abdomen is enlarged, and emaciation rapid, there is some reason to suspect acute enlargement or congestion of the mesenteric glands. In these cases the abdomen is often hard, or tense, or tympanitic, but this is occasioned less by the enlargement of the glands than by concomitant flatulent distension of the bowels, as shown by percussion, and by the comparatively little swelling of the abdomen, which is often produced by this state of the glands alone.

12. ii. CHRONIC DISEASE OF THE MESENTERIC GLANDS. — Chronic changes in these glands may occur at any period of life, but much more frequent during childhood, than at any other epoch. That these changes are generally tubercular, and occur in the scrofulous diathesis cannot be doubted; but instances occasionally present themselves of *induration* and *enlargement* of these glands, without any proof of tubercular degeneration, and

evidently produced by either chronic inflammatory action, or irritation in them, generally consequent upon irritation of the intestinal mucous surface; but of these further notice will be taken in the sequel.

13. iii. CAUSES. — *a.* The *predisposing causes* of mesenteric decline are, the scrofulous diathesis, a delicate conformation and weakness of the digestive organs; the epochs of infancy and childhood, especially the period intervening between the commencement of the first dentition and the completion of the second; inappropriate, unwholesome, and insufficient food; exposure to cold, and residence in low, cold, and humid localities. From the undoubted scrofulous nature of the disease, in the great majority of instances, the predisposing causes of scrofula are to a great extent influential in producing it. Although the scrofulous nature of tabes mesenterica has been denied by a few writers, yet the frequent dependence of the latter upon the former has been so fully shown by GUY-DE-CHAULIAC, RIOLANUS, MORGAGNI, PORTAL, CULLEN, BICHAT, MECKEL, A. COOPER, BAILLIE, CHEYNE, JOY, and others, that it can no longer be doubted. Indeed, the frequent appearances of tubercles in the lungs, cervical and bronchial glands, and in the mesentery, either in various states of succession or coetaneously, is a proof of intimate connection between both maladies, if not of the dependence of the mesenteric disease upon the strumous diathesis. Nevertheless, congestion, enlargement, chronic inflammation and its consequences, are met with in these glands, independently of the scrofulous taint, and consequent merely upon chronic irritation of the intestinal mucous surface, whilst in other cases, tubercular change in the mesenteric glands may be the only manifestation of this taint, although this is rarely the case, as signs of it are generally also evinced in other parts of the body, or in the general conformation.

14. The disease may occur at any age, even as early as the period of birth; and it not infrequently appears soon after birth, particularly in infants brought up by hand, and deprived of the warmth of the mother's bosom; and in those which are suckled by unhealthy, consumptive, or debilitated nurses, or by nurses who have suckled for too long a period. It commences more frequently soon after weaning than at any other time, evidently owing to incongruous or inappropriate food. Residence in close, crowded, cold, and damp situations, without due exposure to the light and rays of the sun; insufficient or unwholesome nourishment; a want of requisite exercise in the open air; inadequate clothing and want of cleanliness; sleeping in crowded and ill-ventilated chambers, and with insufficient protection from cold or the night air, are not infrequent predisposing causes, but are also influential *existing causes*, of the disease. Indeed, in the majority of cases, improper or insufficient feeding, and deprivation of pure air, are of themselves the chief, if not the only, causes of the malady.

15. *b.* The *exciting Causes.* — Besides these, over-feeding and incongruous articles of food are amongst the most common causes of mesenteric disease. These articles, not being sufficiently digested, irritate the intestinal mucous surface, and the irritation is propagated thence to the glands. Moreover, the chyle formed from them is either imperfectly elaborated, or retains irritating properties, tending directly to excite these glands, and consequently to inflame, congest, or enlarge them. All derangements of the digestive organs, and particularly of the bowels, when neglected or prolonged, especially when affecting children predisposed by the influence of any of the above causes, or naturally delicate, or debilitated by previous disease, may induce lesions of the mesenteric glands, the liability to such lesions being great in proportion to the amount of debility, and to the extent to which a scrofulous taint, original or acquired, may exist.

16. Mesenteric disease sometimes occurs consecutively upon prolonged gastro-enteric inflammation or irritation, upon chronic diarrhœa and dysentery, upon periodic fevers, and especially upon the remittent fever of children, with either of which it may thus become complicated. In both temperate and warm climates, especially in scrofulous constitutions, chronic inflammation, enlargement, induration, and tubercles of the mesenteric glands are not infrequently found, in *post mortem* examinations of these diseases. In some cases, the changes in the glands are owing as much to the treatment of these maladies, as to the gastro-enteric irritation primarily attending them. Excessive purging, the use of drastic medicines, and of stimulating or irritating substances, cannot fail of often occasioning, or of perpetuating where it previously existed, inflammatory irritation of the intestinal mucous surface, which will sometimes be followed by the alterations of the glands now mentioned.

17. iv. SYMPTOMS. — Dr. JOY divides the disease into *two periods.* — 1. That in which tubercles exist, in an indolent state, without having produced irritation in the glands in which they are imbedded, or in the surrounding cellular substance. — 2. That in which the processes of softening and suppuration are going forward. But, as he justly admits, the first period is attended by no symptoms by which the existence of disease of these glands can be inferred, except in the case which very rarely occurs, of these being so much enlarged at this period as to be detected by touch. Indeed, the only disorder that is observable at this period is referrible chiefly to debility, and to the gastro-intestinal surface, and occasionally also to the liver; the mesenteric disease generally originating in these, coexisting with them, and often not manifesting itself until it is very far advanced, or gone on to irremediable disorganisation. Cases are continually presenting themselves of the disease having proceeded even to the second stage without its presence having been suspected; and instances are recorded by MORGAGNI, BAYLE, and others, in which the mesenteric glands were in a state of suppuration; and yet the patients, who had died of some intercurrent malady, were in good condition.

18. GARDIEN and RAIMANN divide the disease into three stages: — The *first*, or premonitory, which is characterised by languor, debility, pallor, abdominal distension and flatulence, and by disorder of the stomach and bowels: — the *second*, by emaciation, by fetid, and sometimes white stools, by hectic fever, and occasionally by enlargement of the cervical glands, and irregular hardness of the abdomen, caused by the diseased mesenteric glands: — the *third*, by colliquative

sweats or diarrhœa, by slight chills or rigors, by extreme emaciation; by a weak, small, and very frequent pulse, and all the phenomena of confirmed hectic; and by varied, offensive, and lienteric evacuations.

19. It is very obvious to those who have frequently observed this malady, that all divisions of its course are arbitrary. When its uncertain commencement, its consecutive or secondary nature, and its complications and constitutional effects are considered, the attempt, not only to divide its progress into precise periods, but also to describe its phenomena with unerring accuracy, must be altogether futile. To impose an air of constancy on what is always changing is only to mislead, and is calculated to generate a dangerous confidence where a cautious diffidence only ought to be entertained. In these circumstances — in this disease more especially, which is generally the consequence of antecedent disorder, is merely a portion of that continued chain of morbid action, commencing in faulty organisation, or in functional disorder, and terminating in organic change — we should content ourselves with ascertaining and stating those phenomena which most commonly attend it, with marking their more common procession, and with cautioning the inexperienced, that, although these phenomena are commonly present, they are not invariably or universally remarked, and that they are variously grouped, and associated with other symptoms, according to the circumstances of individual cases, and to the complications of, or changes produced by, the disease.

20. *a*. Most of the *early symptoms* are referrible chiefly to debility, manifested principally in the digestive organs, and to asthenic inflammatory irritation of the digestive mucous surface. There are general depression, languor, and dulness, with pallor and collapse of the countenance. The lips swell, and become slightly fissured, especially at the commissures. The appetite is capricious, variable, sometimes ravenous and perverted; and flatulence, abdominal distension, uneasiness, and general disturbance follow a full meal. There is sometimes a craving after the most indigestible substances, and the more voracious the appetite, the more marked become the abdominal symptoms and the emaciation. The belly is large and tense, but not painful on pressure, unless on firm or prolonged pressure. The breath is offensive, the tongue loaded, variable, or streaked; and the perspiration is acid, heavy, or nauseous, owing to the state of the follicular secretion. At an early period, pain is sometimes felt in the back and loins; and sharp, lancinating, or griping pains, of short duration, but recurring three or four times in the day, are often experienced deep-seated in the abdomen. Occasionally nausea and mucous vomiting occur, without, in some cases, affecting the appetite. The state of the bowels is at first variable, but generally much confined, or extremely relaxed, the latter being most frequent or prevalent as the disease advances. The stools are unnatural, offensive, mucous, and subsequently yeasty or chalky, and occasionally contain worms, which had been generated probably long before, owing to chronic debility of the digestive functions.

21. With the increased fulness, the hardness of the abdomen becomes more remarkable, and emaciation advances rapidly. The pulse is accelerated, particularly towards evening; and during sleep, profuse perspirations break out on the forehead and breast. Fretfulness, dulness of the mental faculties, and aversion from all exertion, are generally manifested.

22. *b*. At an *advanced period* the emaciation, hectic symptoms, and disorder of the bowels become still more remarkable. The features are collapsed, sharpened, pale, and wrinkled, imparting an unnatural appearance of old age. The eyes are sunk, without lustre, and surrounded by a dark or livid circle. The limbs are so emaciated as to resemble sticks covered by loose and wrinkled integuments, and contrast strongly with the hard and tumid abdomen. The appetite frequently is still ravenous, and generally also capricious or perverted; and the ingesta passed insufficiently changed, or altogether undigested. The bowels are very much relaxed, and the stools are lienteric, and generally deficient, or entirely deprived of bile. Their white or chalky appearance has been imputed to the presence of chyle rejected by the lacteals. It is, however, doubtful whether or no the food is sufficiently digested to form so much chyle as to account for this appearance, which may be partly owing to a morbid secretion from the intestinal glands. Sir A. COOPER supposed, that the whitish earthy-looking state of the stools is owing to the presence of calcareous matter, but the question has not been determined. Ultimately, the marasmus becomes extreme, but delirium or sleeplessness is rarely observed, and death takes place from exhaustion or inanition, or is accelerated by some contingent inflammation or lesion, as peritonitis, pneumonia, universal bronchitis, or serous effusion within the cranium. Such is the usual course of the disease; but the symptoms vary not only in different cases, but also in the same case.

23. *c*. The *duration* of the malady is various, according to the nature of antecedent and concomitant disorders, and of consecutive lesions. Owing to the common association with it of chronic inflammation of the intestinal mucous membrane, the *pain* felt in the abdomen is to be attributed as much to that affection as to the mesenteric disease, particularly when it is only occasional, intermittent, and griping. That which proceeds chiefly from the mesenteric disease is dull or aching, is referred chiefly to the centre of the abdomen and back, and is not increased by pressure unless it be firmly directed to the back. When severe and continued pain is felt in the back and loins, it is sometimes owing to concomitant disease of the vertebræ. *Swelling* of the abdomen is very general, but it is owing chiefly to flatulent distension of the bowels, consequent upon debility and chronic inflammatory irritation of their mucous surface; the disease of the glands forming but a small part of this swelling. Accumulation of fæcal and indigested matters sometimes also contribute to the abdominal distension. It is comparatively rare, that the enlarged glands can be felt through the abdominal parietes, unless the abdomen be much sunk or collapsed, as well as emaciated. The irregular swelling and hardness sometimes mistaken for these glands, have occasionally been owing to fæcal accumulations in the cells of the colon, to tubercular disease of the peritoneum, or to some other lesions. The urine is often diminished in quantity; sometimes

it is milky in appearance, and contains the earthy phosphates.

24. v. Complications and Consecutive Lesions. — This disease is rarely simple even at any one period of its course; and it is but seldom primary, some disorder preceding it, and accompanying its early or advanced progress. These disorders have been already noticed (§§ 15, 16.); but the most common are chronic inflammatory action in the intestinal mucous surface, tubercular disease of the lungs, intestinal worms, and tubercular enlargement of various glands; more particularly of the cervical, bronchial, and axillary glands. In most cases, the *affection of the bowels* both precedes and accompanies the mesenteric malady; although, in scrofulous constitutions, the latter may precede the former; but the chronic inflammation, enlargement and induration of the mesenteric glands, without scrofulous infiltration of them, which is sometimes met with particularly in adults, is almost always caused by the intestinal disease, especially by disease of the intestinal glands. The same remarks apply to the form of intestinal irritation attending, and in some respects constituting, *infantile remittent fever*, in the course of which mesenteric disease is often developed. The connection of this latter with *intestinal worms* is shown by the frequent evacuation of them during the course of the malady; the worms existing previous to alteration of the glands, co-existing with its early stages, and disappearing as it proceeds to a fatal issue.

25. *Phthisis pulmonalis* is very frequently associated with scrofulous disease of the glands of the mesentery, and either malady may precede the other. Although the disease of the lungs may not be attended by that of the glands, the latter rarely exists for a considerable time without inducing the former. *Inflammation of the peritoneum*, especially chronic peritonitis, or even chronic tubercular peritonitis, may be complicated with this malady, but commonly as a consequence of chronic inflammation of the intestinal glands and mucous surface; the inflammatory action extending, with or without ulceration, from the internal to the external coats of the bowels. On examination of fatal cases of chronic diarrhœa or dysentery, in both temperate and warm climates, mesenteric disease is not infrequent, the malady commencing with disorder of the intestinal mucous surface, which has been followed by ulceration, by alteration of the mesenteric glands, and ultimately by some form or other of peritonitis, occasionally extending to the surface of the mesentery. Scrofulous disease of the *vertebræ*, *rachitis*, and inflammation or suppuration of the *psoæ muscles*, or of the adjoining cellular tissue, sometimes also complicate the mesenteric malady.

26. Of the above complications, more than two may co-exist in the same case. Thus, *after death*, I have observed extensive disease and agglomeration of the mesenteric glands, ulceration of the intestines, chronic peritonitis, and tubercular disease of the lungs — a combination by no means infrequent.

27. There are also *certain alterations*, sometimes contingent upon the mesenteric disease, deserving notice. Of these, serous effusion within the cranium is not the most infrequent. The inflamed and suppurating glands may also give rise to various changes in their vicinity — to peritonitis from perforation of the peritoneum, to ulceration into the intestinal canal, and to pressure upon adjoining canals and cavities, as the pylorus, common bile and pancreatic ducts, &c. Sir A. Cooper mentions the occurrence of adhesion of the suppurating glands with the parietes of the abdomen, and the discharge of their contents externally, or even both externally and internally into the intestinal canal, thereby giving rise to an artificial anus. The appearance of pus in the stools consequently upon scrofulous suppuration of the mesenteric glands, has been attributed by Schmalz and others to the opening of the abscesses thus formed in the mesentery into the cavity of the intestines. This result, however, must be rare; the purulent matter observed in the stools being more probably formed by the chronically inflamed villous surface of the bowels, and by incipient ulcers. I have seen not only in children, but also in adults, compression, irritation, and inflammation of adjoining parts, produced by the diseased lacteal glands. Pressure upon, and narrowing of, the pylorus, or of the common bile and pancreatic ducts, occasioning vomitings of the ingesta, &c. in the first case, and jaundice in the second, are not very rare consequences of the mesenteric disease. M. Andral states that the ureters, and even the vena cava, may be so compressed by the enlarged glands as to occasion dropsy.

28. vi. Diagnosis.—From what I have stated, and from the very frequent complications of the malady, it may be inferred, that an accurate diagnosis of it, particularly in the earlier parts of its progress, is by no means easy. The diseases with which it is most commonly confounded are chronic inflammation of the mucous surface of the bowels, infantile remittent fever, intestinal worms, chronic and tubercular peritonitis, and scybala retained in the cells of the colon. Although it is of importance, especially in respect of the *prognosis*, to ascertain the exact pathological condition, and how far either of these may exist singly, or be associated with one another, or with some different malady, still a mistake in their diagnosis is rarely attended by serious results, owing to the general indications of cure being nearly the same for all, although the means should be varied for each.

29. The phenomena more *particularly indicating mesenteric* disease at an early period are, the scrofulous diathesis and phthisical state of the patient, with a blanched and relaxed skin; irregularity of the bowels and stools, or diarrhœa, the evacuations being undigested matters rather than morbid secretions; the ingestion of food not being followed by immediate inconvenience, as increase of pain, or calls to evacuation; the nature of the ingesta not sensibly influencing the disease; the absence of thirst, of heat of skin, and of tenderness of the abdomen; emaciation, and collapse of the features; and absence of indications in the stools of irritation of the intestinal mucous surface.

30. *A. Infantile remittent fever* is liable to be mistaken for mesenteric disease; and, as I have above stated (§ 24.), it often occasions this malady. It is very difficult to distinguish between these diseases, especially during the early stages of the latter; but, in the mesenteric disease, there is a more general manifestation of the scrofulous diathesis, often with enlargement of the cervical and other glands, than in the infantile remittent.

The emaciation is greater and more rapid, whilst the appetite is more ravenous and more perverted. The remittent fever is attended by short intervals of apparent improvement, and always with regular diurnal remissions, which are not so evident in the mesenteric disease until the last stage, when it assumes the truly hectic form; and, in this stage, the extreme emaciation, distension and knotty hardness of the abdomen, the chalky or lienteric state of the stools, and the general appearance of the patient, will readily distinguish it from *infantile remittent* (see art. FEVER, § 278. *et seq.* for the history of that disease).

31. *B. Chronic inflammation of the intestinal mucous surface*, whilst it very frequently occasions mesenteric disease, is readily confounded with it in its early course. But the intestinal affection is attended by greater heat, pain, and tenderness of the abdomen, than are observed in the mesenteric disease; and by more thirst, more febrile excitement, and more mucous or greenish stools; the symptoms being all increased by the ingestion of food, especially of stimulating food. The common association of the intestinal with the mesenteric disease, and the frequent origin of the latter in the former, render the diagnosis extremely difficult. Still attention and experience will enable the physician not merely to distinguish between them, but also to recognise this complication, as well as the other associations and consequences of the disease alluded to above (§ 24. *et seq.*), particularly if the causes, the several concurring influences, and the effects of treatment, be taken into consideration.

32. *C.* The symptoms of the common *round worm of the intestines* resemble mesenteric disease, particularly in respect of the ravenous appetite, the tumid abdomen, and emaciated extremities; but the absence of the characters of scrofula, the itchings of the nose and anus, frequent startings, grinding of the teeth, and the effects of remedies, in the former, will distinguish between them when they are not associated; but when associated, as is sometimes the case, the diagnosis is much more difficult.

33. *D. Chronic peritonitis*, simple or tubercular, may be mistaken for mesenteric disease, and is not so readily distinguished from it as stated by Dr. PEMBERTON. It is generally attended by more tenderness and pain on pressure than the latter, and by superficial pricking pains. In chronic peritonitis, the abdomen imparts the sensation of more superficial hardness or of being bound down, and it is more generally dull on percussion than the mesenteric malady. Vomitings, also, are more frequent in the former than in the latter. Peritonitis, however, is generally a consequence of chronic inflammation of the intestinal mucous surface, which may develope mesenteric disease either previously to, or coetaneously with, the peritonitis. In this case, the peritonitis will mask the mesenteric disease. In many cases of chronic peritonitis which I have seen thus developed in children, I have met with very few where the mesenteric glands were not found diseased upon dissection.

34. *E.* The frequent association of *phthisis* with mesenteric disease above alluded to (§ 25.) may be detected, particularly when the former is advanced, by shortness of breathing, by short hacking cough, by the expectoration, by percussion, and by the stethoscopic signs. When the bronchial glands are the seat of tubercles, and the lungs are comparatively free from them, the diagnosis is extremely difficult. Moreover, tubercular disease within the chest may be confounded with mesenteric disease, the diarrhœa and state of the stools attending an advanced period of the pulmonary malady increasing the difficulty of the diagnosis. It is only by a careful examination of the thorax and abdomen, by auscultation and percussion, that the difference between them, as well as the association of both (which is more common than is usually suspected), can be fully ascertained.

35. *F.* When the mesenteric disease is *far advanced*, it generally manifests itself so as not to admit of doubt, unless it be masked by chronic peritonitis, or by serous effusion into the peritoneal cavity. At this period the enlarged glands may be sometimes felt, especially if the patient is examined early in the morning, and when fasting. But scybala retained in the cells of the colon may be mistaken for them. The enlarged glands, however, are found nearer to the centre of the abdomen, and are attended by slight pain when examined with firm pressure. Scybala, on the other hand, are detected in the course of the colon, particularly in the left iliac fossa, and are not usually accompanied by tenderness on examination; nor by much emaciation, or lienteric stools. In these cases, which admit of doubt as to the presence of scybala, the use of purgatives, aided by enemata, will generally assist the diagnosis. I have met with instances of indigestible substances retained in the cells of the colon for many months, occasioning abdominal fulness with hardness, emaciation, and constitutional disorder, which were mistaken for mesenteric disease, but which were removed by the strenuous use of stomachic purgatives, the substances causing the disorder sometimes resisting the operation of purgatives for many days.

36. vii. APPEARANCES AFTER DEATH. — The mesenteric glands present, in the disease now described, particularly as it occurs in all climates and at all ages, although most commonly after weaning and in childhood, all the changes described in the article LYMPHATIC GLANDS (§ 54. *et seq.*), the tubercular changes being very much the most frequent. At an early stage the glands are redder, larger, and denser than natural; and subsequently tubercular matter is deposited either within or around them, or both; its accumulation causing atrophy and ultimately destruction of the glands, this matter occupying their places, and, in some instances, accumulating to such an extent, as to give rise to an agglomeration of them into one very large mass. Those glands, containing tubercles which are advanced, are of a dull white colour and firm consistence; and, when the deposit is not very large, the lymphatic vessels in the glands still allow injections to pass through them. This circumstance has induced some to suppose that the tubercular matter is not accumulated in these vessels, but is deposited in the cellular tissue of the glands. Ultimately the tubercular matter softens, and presents appearances, and produces changes, similar to those observed in tubercular disease of the lungs.

37. Besides the diseased mesenteric glands, inflammation and ulceration of the intestines, par-

ticularly of the lower portion of the ileum; inflammation and adhesion of the peritoneum, often with tubercular formations; and tubercular disease of the lungs, and of the bronchial and cervical glands, are found in most instances. There are very few cases, in which these alterations of the digestive mucous surface and lungs are not observed in addition to the mesenteric disease. Tubercles are also occasionally found in other situations, as in the liver, brain, &c.; and serous effusion in the peritoneum and between the membranes of the brain, with or without tubercular formations, is also sometimes met with.

38. viii. The nature of the disease is manifest from its early history and ultimate changes — both classes of phenomena showing that the mesenteric alterations are a part only of a general or constitutional malady — that these alterations, with those often associated with them in the lungs, peritoneum, and other glands, are generally manifestations of scrofula, which, as they become developed, react upon the frame, increasing debility, and producing irritation, fever, and its usual consequences. The common procession of disease is generally as follows: — at first, constitutional vice and debility, impaired digestive and assimilating functions, irritation of the digestive mucous surface, and imperfectly elaborated chyle; subsequently, irritation and enlargement of the mesenteric glands, followed by tubercular deposits in them, and in other organs or parts; and, lastly, constitutional irritation and hectic fever; the extreme emaciation ultimately produced being not so much a consequence of obstruction of the mesenteric glands, as of the hectic or irritative fever, and of the changes in the bowels, lungs, and other parts.

39. ix. Prognosis.—When the disease is clearly manifested, the prognosis is unfavourable; and no hopes of recovery should be entertained when it is associated with tubercles in the lungs, or with chronic peritonitis. On the other hand, when the disease is not far advanced, and before hectic symptoms are established, or the emaciation become great, or the stools have assumed a chalky or lienteric appearance, hopes of recovery may be entertained, although, even in these cases, a cautious prognosis should be given. The younger the child the greater is the danger. The causes and complications of the disease should also in some degree influence the prognosis. When these causes admit of removal — when unwholesome food and impure air produce the malady, and may be removed — and when intestinal irritation is the only complication, then a more favourable opinion may be given than in other circumstances. An improvement in the colour and expression of the face, a reduction of the size of the abdomen, a more fæculent character, and less frequent passage, of the stools, a gradual recovery of flesh, and a diminution or disappearance of evening accessions of fever, are indications of recovery.

40. x. Treatment.—The *indications* of cure are — 1. To ascertain the predisposing and exciting causes, and to remove them. 2. To support the constitutional powers, to restore the diseased glands to their healthy state, and, at the same time, to allay irritation of the alimentary canal. 3. To remove associated disorder, and to prevent the occurrence of disease in related organs or parts.

41. *A.* The *removal of the causes*, when fully accomplished early in the disease, will sometimes of itself restore the patient to health. It is true, that the early progress of these cases admit of great doubt as to their being cases of mesenteric decline. But, although they may not be fully developed instances of this malady, they are fast progressing either towards it or towards as dangerous a malady, namely, to chronic ulceration of the intestines and consequent peritonitis. If, in infants at the breast, the nurse's milk have disagreed, or if the milk be poor, innutritious, or disordered by prolonged suckling or ill-health, the nurse should be changed; and the infant should have the advantage of wholesome milk, and the warmth of the bosom of a young and robust nurse. When the disease manifests itself at this early age, the enjoyment of vital warmth is next in importance to wholesome and nutritious food. If the disease be caused by weaning, or by inappropriate, too much, or incongruous food, causing irritation of the digestive mucous surface and an imperfectly elaborated chyle, a change of diet, a trial of the more digestible and less irritating kinds of food, and a liberal use of asses' milk warm from the animal, sometimes with lime-water when the bowels are much relaxed, are means which should not be neglected. In all instances, but particularly when the patient resides in large towns, or in close ill-ventilated situations and chambers, change of air into the country, or to the sea-side, selecting dry and elevated localities, is one of the most successful means of cure that can be adopted. These advantages will be greatly enhanced by regular exercise in the open air, and by exposure to light and sunshine.

42. The frequent commencement of tabes mesenterica in chronic irritation of the intestinal canal, in infantile remittent fever, and in other disorders mentioned above (§ 24.), points out the importance of removing these diseases as soon as possible; and as they originate in the same circumstances and causes which are so productive of this malady, treatment will often be unavailable for them, if unaided by change of air and its consequent advantages.

43. *B.* Before developing the *second indication of cure*, which comprises the strictly medical treatment of the disease, I shall take a brief view of the means recommended by other writers. These consisted, in this country, until a comparatively recent period, chiefly of mercurials in some form or other, generally conjoined with purgatives or alteratives; the use of other more rational means being commonly stigmatised with the designation of "inert practice," nothing appearing to many either good or appropriate, or efficacious, to which the term "active," as regards its immediate operation, was not applicable. No small mischief arose in those days from attempts made to reduce a tumid abdomen by means of cathartics or purgatives, the improper use of which often increased the flatulent distension, perpetuated intestinal irritation, and thereby, as well as by reducing the constitutional powers, augmented the mesenteric malady, and developed several of its most fatal complications.

44. *a. Mercurials*, and more particularly the *chloride* of mercury, have been prescribed for this disease by Baillou, Bordeu, Portal, White, Curry, and many others. Underwood gave calomel twice or thrice a week, and the carbonate

of soda during the intermediate days. He also had recourse to an infusion of burnt sponge and senna; and afterwards to bitters and chalybeates. Dr. Burns recommended calomel with mild purgatives, and gentle tonics and frictions of the abdomen. Dr. Pemberton advised calomel to be given at bedtime, salts in the morning, and tonics with conium in the intervals. Mr. Abernethy and his disciples prescribed calomel, with rhubarb and ginger, on alternate nights — or blue pill and laxatives, followed by a prolonged course of Plummer's pill and sarsaparilla. Sir A. Cooper always resorted to the *bichloride of mercury*, one grain being dissolved in two ounces of the tincture of cinchona or of rhubarb and a tea-spoonful given twice a day. He also advised plasters over the abdomen, or frictions, and a nutritious diet. Farre and others confided in mercurial frictions. Cullen, with much justice, has condemned the use of mercurials if otherwise prescribed than as occasional purgatives or alteratives; and there is no doubt of their having been hitherto too often employed in this disease in an indiscriminate and empirical manner. Still, when the liver is torpid, the stomach is irritable, and the lower bowels inactive, the milder mercurial preparations, conjoined with rhubarb, or with rhubarb and magnesia, or an alkaline carbonate, are often of essential service; and I have found the practice advised by Sir A. Cooper, modified according to circumstances, sometimes of service.

45. *b.* The same remark applies to the use of *purgatives* generally. The advantages which arise from them can be realised only by a judicious selection of them, and by the use of them appropriately to the circumstances of the case. Fordyce preferred *rhubarb*, and conjoined it with the *neutral salts*, especially the tartrates. Herz and Beaumes also preferred rhubarb, the former giving it with the *acetate of potash*. Most writers and modern practitioners have prescribed it, either in substance or infusion, with the *sulphate of potash*. Dr. A. Thomson has praised the combination of the two with calumba, directing ten grains of sulph. of potass., six grains of calumba, and three of rhubarb, thrice daily; and frictions of the abdomen with soap liniment. Whilst purgatives have been thus generally employed, the selection has been chiefly limited to those which are the least weakening, or the most likely to produce deobstruent effects. The exhibition of *tonics* with these, or in the intervals between them, has been very generally adopted; and, although the practice has been inveighed against by Broussais, and his followers as being injurious, in respect not only of the combination of the two classes of remedies, but also of the employment of either of them singly, still it is appropriate to many cases, and to certain states and stages of the malady; and, as regards the results, more successful than the application of leeches to the abdomen, and the employment of demulcents recommended by this physician and his once numerous disciples.

46. *c.* Various *alteratives*, or substances intended to produce an alterative and a deobstruent or tonic effect, have been prescribed for this disease besides mercurials. Pinel, Hebréard, Hufeland, and others, have recommended the *muriate of barytes*, but Ferriar and Thomson have not confirmed the opinion expressed of it by these writers. Dr. J. Hamilton was favourable to the use of *antimonials* when aided by a warm bath every night, by frictions with an opiate liniment, and by nourishing diet. There are few alteratives more serviceable in mesenteric disease than *alkalies* and alkaline carbonates, conjoined with mild tonics; and there is none more generally prescribed for it. Still, neither these, nor any of the medicines already mentioned, should be depended upon solely, different means being required with the varying characters of the malady.

47. *d.* It is obvious that, when disease is so far advanced as to enlarge the mesenteric glands, or to occasion symptoms usually attending or indicating this lesion, it becomes necessary to *support the constitutional powers, whilst we endeavour to restore these glands to their healthy functions and condition;* and it is equally obvious, that neither can the constitutional powers be supported, nor the glands be restored to health, as long as irritation is allowed to exist in the alimentary canal. Therefore, having cleared away morbid secretions and fæcal accumulations, those substances which are most *calculated to correct, improve, or restrain morbid action and secretion,* should be prescribed. With this view, small doses of hydrargyrum cum cretâ may be given at bedtime, either with Dover's powder, or with ipecacuanha and extract of poppy or of hop; and, during the day, creasote may be taken with demulcents, and with cretaceous mixture and the compound tincture of camphor, if the bowels be much relaxed. A warm bath should also be used at bedtime, and the abdomen be afterwards rubbed with a liniment composed of the compound camphor and the turpentine liniments, to which a little of olive oil and of cajuput oil may be added. The patient should wear flannel next to the skin, and sleep in blankets or in cotton sheets; and be allowed light nutritious diet. If the bowels become confined, rhubarb and sulphate of potash, or castor or olive oil, may be given; or their action may be solicited by means of an enema containing these oils, alone or with spirits of turpentine. Having in some degree allayed irritation and corrected morbid secretion by these means, or even without having attained these ends, these remedies having been prescribed during a few days, the preparations of iodine* should be cautiously resorted to.

48. But, in order that any advantage may be obtained from these preparations, and even that mischief may not be caused by them, it is essentially requisite to prescribe them in small doses, and to carefully observe their effects. If the bowels be too much relaxed, the *iodide of lead* or *of iron* may be given with *ipecacuanha*, and extract of hop or of poppy in the form of pill; but

---

* The author was probably the first in this country, and certainly amongst the first in any country, to prescribe these medicines in this and in other constitutional maladies. When he returned to London from the continent in 1820, he brought with him those preparations of iodine which had then been tried abroad; and as soon as they and others were prepared, or introduced into this country by Mr. Morson, he had recourse to them in private and public practice. The same remark applies to *creasote* and some other substances. The first dose of creasote prescribed in this country, was by the author in consultation with Dr. Roscoe. This medicine, however, was not then to be procured in London; Mr. Morson, who was and still is the principal manufacturer of it, being then obliged to obtain it from abroad before the prescription could be prepared.

in other circumstances, and at an early stage of the disease, the *iodide of potassium* may be prescribed with the liquor potassæ in the infusion or decoction of cinchona, or in any tonic tincture, with the compound tincture of camphor. The *turpentine liniment*, or *embrocation*, should also be applied over the abdomen, and the diet and regimen advised for this (§§ 41. 53.) and other scrofulous diseases strictly pursued.

49. The diseased state of the digestive mucous surface has been considered by Broussais and his disciples to contra-indicate the use of iodine, and all tonic and stimulating substances. But the affection of this surface is not a true inflammation, at least not a sthenic form of inflammation, but rather a state of asthenic capillary congestion, which is more readily removed by tonics and stimulants, especially such as are also astringent, than by relaxants or depressants; and which not infrequently passes rapidly into ulceration if the former be not resorted to.

50. The principal error in the treatment of this malady has been that of viewing and treating it as limited to the mesenteric glands, and without reference to other lesions often associated with it, and to the states of *vital depression* and of *anæmia*, attending not only its advanced, but even its early progress, in many instances. In these states, and even in those associated with tubercular disease of the lungs, the preparations of iron, in suitable forms of combination, are especially beneficial. Although curious, it would be almost endless, to notice the various preparations and numerous modes of combining them, recommended by authors in this and in other diseases, with which it is often associated; each one, with a more ardent desire to appear original than to prove useful, praising his own way of exhibiting them. Having had no small experience of most of the preparations of iron, I can state that most of them are more or less beneficial in those states and associations of this disease just mentioned, but that some of them are to be preferred to others. The iodide of iron prescribed in the syrup of sarsa, and syrup of poppies, if the bowels be too open; the mistura ferri composita, with the tinctura camphoræ composita, and extractum conii; combinations of the oxides of iron with the alkalies or alkaline carbonates; the tincture of the sesquichloride of iron, or of the ammonio-chloride, with or without a small dose of the dilute nitric acid, and two or three drops of the tinctura opii, or tinct. camphoræ comp.; the sulphate of iron with the carbonate of an alkali, and with rhubarb or powdered cascarilla; the compound steel pill with soap, or the compound soap pill and ipecacuanha, are preparations and combinations of them severally employed by me in those conditions of the disease in which the support of the vital energies, and the promotion of assimilation and sanguification, are more particularly indicated; but I have never overlooked those external means and applications alluded to above (§§ 47. 48.), and have generally employed them at the same time. There are various other recently introduced preparations of iron, which are more fashionable than efficient. I have tried them sufficiently, particularly the lactate, the citrate, the ammonio-citrate, and the ammonio-tartrate of iron. Of these, the first and the last are the most efficacious, and to children especially the most palatable. The others are also sufficiently palatable, but this is their principal virtue.

51. Whilst these or other tonics are being employed, the bowels will generally require due regulation, by means of narcotics and astringents when they are too relaxed, and of stomachic or chologogue purgatives when they are costive. In all cases, care should be taken to preserve a due secretion of bile, as this fluid is necessary not only to the elaboration of healthy chyle, but also to a healthy state of the intestinal mucous surface. Hence I have (since 1818) always prescribed the *inspissated ox-gall* with the above or other medicines, when the secretion of bile has been deficient, and the digestive mucous surface irritable and relaxed; although, for some years, this substance could not be procured at the principal chemists or druggists until I directed the preparation of it, so entirely had it been overlooked in this country. Numerous formulæ containing it will be found in the *Appendix* and in the early part of this work. Long subsequently to the publication of these, and very recently, some writers in periodical works have lauded its properties, with attempts at originality to which they had not the smallest claims.

> "Miranturque novos fructus, et non sua poma."

52. *C.* The *third intention*, viz. to remove associated disorder, and to prevent the occurrence of disease in related organs, as far as either object can be attained, can be accomplished only by fulfilling the indications already developed; for the chief complications, namely, irritation of the digestive mucous surface, infantile remittent fever, tubercular disease of the lungs or of other glands, &c. are best combated by the means already specified, aided by change of air, diet, and regimen; and these, at the same time, are the most likely to prevent the occurrence of more extensive disease, by supporting the constitutional powers, and promoting the digestive and excreting functions. Whatever complication may appear in the course of this disease is necessarily characterised by asthenia, owing to pre-existing depression of the vital powers, and to imperfect sanguification and assimilation, and is irremediable unless by restorative means, in conjunction with such as the nature of the complication may require. But, in most of these complications, as well as in the more simple states of the disease, external derivatives, and means which will allay or diminish excessive action and secretion, where either is augmented, or which will increase either or both, when impaired or arrested, are chiefly indicated. A careful diet and regimen will also materially advance these objects.

53. *D. Diet and regimen* constitute a principal part of the treatment of this disease; but the former cannot always be assigned with sufficient precision — no particular kind of food proving beneficial in all cases, and rarely even in the great majority. For the youngest class of patients, the milk of a healthy nurse, the warmth of her bosom; light farinaceous food, with warm or boiled milk; asses' milk or goat's milk, warm from the animal; change of air, particularly to the sea-side; warm salt-water bathing, and gentle, but regular exercise in the open air and sunshine; and flannel clothing next the skin, are generally beneficial. If the disease appear after weaning, nearly the

same diet and regimen as now advised, with small quantities of the lightest kinds of animal food, or animal broths with boiled rice, or with stale or toasted bread, &c. are required. At a somewhat later period of life, the farinaceous kinds of food boiled with milk, and the more digestible articles of animal diet, may be allowed in such quantity as the peculiarities of the case and the amount of exercise may suggest. Sea-bathing in summer and autumn is also necessary. In general, bulky vegetables and fruits should not be given; and the intervals between meals ought to be duly regulated, as well as the quantity of food, according to the age and strength of the patient, and stage of the disease.

54. *E.* For the *prevention* of the disease, when it is threatened, the means just specified, particularly change of air; sea, or country, or pure air; sea-bathing, and flannel worn next the skin; suckling by healthy nurses for a sufficiently long period — from nine to fourteen months; nourishing and digestible food; exercise in the open air, and attention to the states of all the secretions and excretions, correcting and promoting them as circumstances may arise, are the means on which only dependence can be placed.

BIBLIOG. AND REFER. — *Ingrassias*, De Tumoribus præterNaturam, &c. p. 11. — *Martini*, De Morbis Mesenterii abstrusioribus, 8vo. Lips. 1630. — *Bartholinus*, Hist. Anat. Cent. iv. Hist. 96.—*Bontius*, De Medicinâ Indorum, cap. ii. — *Wharton*, Adenographia, cap. ii. — *Bonet*, Sepulchretum, l. ii. sect. vii. ob. 129. 133.—*Morand*, in Mém. de l'Académie des Sciences, ann. 1729. — *J. J. Grambs*, Anatom. Beschreibung eines Monstrosen Gewachses am Mesenterio, 4to. Frankf. 1730. — *R. Russel*, De Tabe Glandulari, sive de Usu Aquæ Marinæ in Morbis Glandularum, 8vo. Lond, 1750. — *Delharding*, in *Halleri* Collect. Disp. Pract. vii. n. 240. — *Meckel*, in Mém. de l'Académie de Berlin, 1753, p. 67. — *Morgagni*, De Sed. et Caus. Morb. Ep. xxxiv. art. 21.; xxxix. art. 5, 6, 7, 8.; xliv. 3, &c. — *Lieutaud*, Hist. Anat. Medica, t. i. obs. 521. 526. 552, *et seq.* — *Bang*, Acta Reg. Soc. Med. Haun. t. i. p. 259. — *Vetter*, Aphorismen, &c. i. p. 158. — *Beaumes*, Mém. sur la Maladie du Mésentère propre aux Enfans que l'on nomme vulgairement Carreau, &c. Nismes, 1788; et Traité de la Première Dentition, &c. ch. iii. 3. — *Ebhard*, De Statu Mesenterii Naturali et Præternaturali, 8vo. Jena, 1755. — *Monro*, in Med. Transact. &c. vol. ii. n. 18. — *R. Willan*, in Medical Facts and Observations, vol. iii.—*Portal*, Sur la Phthisie de Naissance, in Mém. de l'Acad. des Sciences, 1781; et Cours d'Anat. Médicale, t. v. p. 260, *et seq.* — *Cullen*, Practice of Medicine, edit. by *J. Thomson*, vol. ii. p. 562. — *J. P. Frank*, De Cur. Hom. Morbis, l. ii.; De Inflammationibus, t. ii. p. 224. — *Conradi*, Handbuch der Speciellen Pathol. und Therapie, b. ii. p. 206. — *Bichat*, Anat. Pathologique, &c. par *A. Béclard*, 8vo. Paris, 1828. — *Baillie*, Morbid Anatomy, p. 209. — *C. R. Pemberton*, Practical Treat. on the Dis. of the Abdominal Viscera, &c. p. 17. Lond. 1820.—*Underwood*, On the Dis. of Children, p. 228. — *Horn*, Archiv. für Pract. Medicin. b. iii. p. 275. — *Hufeland*, Voltstündige Darstellung, &c. ii. n. 4. — *Bayle*, in Journ. de Médecine continué, t. vi. p. 17. 45. — *Laennec*, in ibid. t. iv. p. 509. — *Rullier*, in ibid. t. xi. *App.* — *J. Thomson*. Lectures on Inflammation, &c. p. 136. — *J. Burns*, Princip. of Midwifery, &c. p. 745. — *J. Capuron*, Traité des Mal. des Enfans, &c. p. 416. — *Hildenbrand*, Institutiones Practico-Medicæ, &c. t. iii. p. 290. —*Guersent*, Diction. de Médecine, t. iv. p. 303. — *Meckel*, Handbuch der Pathol. Anat. b. ii. p. ii. p. 379. — *Raimann*, Handb. der Spec. Medécinischen Pathol. und Therapie, b. ii. p. 227. — *Billard*, Traité des Maladies des Enfans nouveaux-nés, 8vo. p. 633. — *Louis*, Mémoires Anatomico-Pathologiques, p. 417.—*Broussais*, Hist. des Phlegmasies Chroniques, t. iii. p. 354. —*J. Kennedy*, Instructions as to the Management of Children in Health and Disease, &c. 8vo. p. 278. Glasg. 1825.—*Andral*, Anat. Pathologique, t. ii. p. 448.; et Clinique Médicale, t. iv. p. 616. — *Darwall*, On the Management of Infants, and the Disorders incident to Children, p. 106. 8vo. Lond. 1830.—*Carswell*, Pathological Anatomy, &c. fasc. iv. 4to. Lond. 1834. —*G. F. Most*, Encyklopädie der Gessammten Medicinisch. u. Chirurg. Praxis, &c. b. ii. p. 188. — *Roche*, Dict. de Méd. et Chirurg. Pratiques, t. iv. p. 621. — *W. B. Joy*, in Cyclop. of Pract. Med. vol. iv. p. 143. — *W. Thomson*, in Lib. of Pract. Med. vol. iv. p. 153. — *C. G. Hufeland*, Manuel de Méd. Pratique, &c. trad. par *J. J. Jourdan*, 8vo. p. 77. Paris, 1841. — *J. Stewart*, Practical Treatise on the Diseases of Children, 8vo. New York, p. 304. 1841.—*Maunsell and Evanson*, Dis. of Children, 4th edit. 8vo. Lond. 1842.

MILIARY ERUPTION.

— SYNON. *Sudor, Miliaria, Sudamina; Febris Miliaris; Purpura Miliaris; Miliaris Sudatoria; Sudor Miliaris; Papula Miliaris*, Auct. *Morbus Miliarium*, Allionius. *Exanthema Miliaria*, Parr. *Febris vesicularis, Febris purpurata Miliaris*, Hoffmann. *Emphlysis Miliaria*, Good. *Purpura alba, Purp. Puerperarum*, Auct. *Hydroa*, Rayer. *Pourpre blanc, Miliaire*, Fr. *Friesel, Frieselblattern, Weisse Friesel*, Germ. *Migliaria*, Ital. *Miliary Fever.*

CLASSIF. — 1st CLASS, 3d ORDER (*Cullen*). 3d CLASS, 3d ORDER (*Good*). III. CLASS, II. ORDER (*Author*).

1. DEFIN. — *An eruption of vesicles, seldom exceeding the size of a millet seed, over a large surface, generally symptomatic of serious disease, or caused by a heating regimen and confined air.*

2. The symptomatic miliary eruption here to be considered, is more correctly designated by the term *sudamina* than by any other, and is entirely different from the "*epidemic sweating fever*," described in another article (see FEVER, § 416.), and which is often attended by a miliary eruption, as there shown. This form of epidemic fever has rarely occurred in modern times; and the miliary eruption, formerly not infrequently met with in lying-in women, is now rarely seen, owing to an improved regimen and practice in these circumstances. Besides being *caused* by irritation of the skin, and especially by *profuse perspirations*, however induced; and besides being an attendant upon the epidemic fever just referred to, the eruption of miliaria or sudamina is met with as an occasional symptom — 1. In those puerperal diseases which are characterised by fever, and a morbid state of the circulating fluids, and are caused by impure air, and a heating regimen: — 2. In the early stages of small-pox, measles, and other eruptive fevers; and in the advanced state of adynamic or typhoid fevers:—3. In the course of fever depending upon gastro-intestinal or internal irritation or inflammation: — 4. In connection with acute rheumatism: — and 5. In the course of puerperal inflammations of serous membranes. In all these circumstances, this eruption is more correctly denominated *sudamina* than miliaria, as it is always attended by a copious perspiration and increased heat; and, although it formerly was not infrequent in those maladies, when a heating regimen was so generally adopted during their treatment, it is now seldom and even very rarely observed.

3. i. The *symptoms* of epidemic, miliary, or *sweating fever*, are fully detailed in the article FEVER (§ 420.), it only remains for me to notice the characters of the eruption, when it is symptomatic of other maladies, or when it occurs after lying-in, or in consequence of copious perspirations and a heating regimen. From what I have already stated, it will be seen that I consider the epidemic fever there described to be more correctly designated by the name of *sweating fever* than by that of miliary fever; and that the term *miliaria* is here viewed as synonymous with *sudamina*. The vesicles of this eruption, seldom exceeding the

size of a millet-seed, are sometimes arranged at some distance from each other, but are generally distinct, and form patches. They are seldom confluent, and rarely coalesce so as to form bullæ. They are at first small and prominent, transparent, and globular; their contents appearing as clear as limpid water, but becoming more opaque or milky. The *surface* upon which the vesicles are scattered varies in colour — 1. With the nature of the disease upon which they are contingent: and 2. With the state of the vascular system as regards plethora, &c. When this eruption accompanies any of the exanthemata, or when the patient is plethoric or robust, the vesicles form upon a red or erythematous surface, and constitute the *miliaria rubra* of authors, the colour of the surface appearing through the limpid and transparent fluid of the vesicles. But when the fluid becomes opaque, white, pearly, or milky, and when the vesicles appear on a comparatively pale surface, the term *miliaria alba* has been applied to them. When they thus occur without inflammatory appearances in the skin, the term *sudamina* is most appropriate.

4. The vesicles naturally *terminate* in resolution without forming scabs or scars, but the cuticle covering them always desquamates. The *duration* of the eruption varies with the circumstances which develope them; but it is generally from three to eight days, or longer. It is sometimes prolonged by the appearance of the eruption in different situations successively; or of a second crop in the same place. The disappearance of the eruption has little or no influence upon the course of the disease, of which it is symptomatic, although some writers have considered a retrocession of it injurious. But, where this has appeared to have been the case, the retrocession may have been the consequence of pre-existing internal mischief, rather than the cause. As the sudden disappearance of the eruption is generally caused by the application of cold, by improper food and regimen, by mental emotions, and other powerful causes, the consequent ill effects are to be attributed to these chiefly.

5. ii. The *diagnosis* of miliaria is easy, owing both to the appearance of the vesicles, and to the circumstances in which they are observed. The only eruption with which it can be confounded is *eczema*, the vesicles of which are crowded in a small space, and are very confluent; whereas, in miliaria, they are distinct and spread over a large surface, always accompany an acute or febrile disease, are rapid in their progress, and of short duration.

6. iii. The *prognosis* of the acute diseases of which miliaria is symptomatic, is not affected by it. The eruption itself only indicates a state of increased action with determination to the cutaneous surface. In connection with epidemic fever, as shown elsewhere (see Fever, § 419. *et seq.*), it evinces a serious state of disease.

7. iv. *Treatment.*—The eruption itself requires comparatively little attention; the disease of which it is symptomatic demanding the chief care. In most of the maladies in which it occurs, a cooling regimen is necessary. Refrigerant drinks, and sub-acid fluids, particularly those containing dilute hydrochloric acid, may be allowed. The patient's room should be well ventilated, and the clothes on his bed ought to be light. The bowels should be kept gently open, and the surface of the body sponged frequently with tepid vinegar and water, or by any other agreeable fluid.

Bibliog. and Refer. — *G. Welsh*, Hist. Morbi qui der Friesel dicitur, 4to. Leips. 1655. — *T. Sydenham*, Sched. Monit. de Novæ Febris Ingressu, 8vo. Lond. 1686; et Opera, p. 643.; also, entire Works by *Swan*, 8vo. p. 495. Lond. 1749. — *D. Hamilton*, De Febre Miliari, &c. 8vo. Lond. 1710; and Treatise on Miliary Fever, 8vo. Lond. 1737. — *F. Hoffmann*, Opera, t. ii. sect. i. cap. 9. — *A. Agostini*, Osservazioni intorno alle Febri Migliari, 8vo. Novar. 1755. — *A. W. Beckers*, Abhandl. vom Friesel, 8vo. Blelef. 1747. — *J. Fordyce*, Hist. Febris Miliaris, &c. 8vo. Lond. 1758. — *C. Bisset*, Essay on the Medical Constitution of Great Britain, 8vo. Lond. 1760. — *Van Swieten*, Comment. &c. sect. 723. 982. — *Fuller*, On Eruptive Fevers, &c. p. 157. — *Allen*, Synopsis, &c. art. 1497. — *Lieutaud*, Synops. Univers. Pr. Med. p. 476. — *Brocklesby*, Med. Observ. and Inquiries, vol. iv. p. 29. — *Cullen*, Synops, Nosol. Method. vol. ii. p. 140.; and Practice of Physic, vol. ii. p. 100. — *C. White*, Treat. on the Management of Pregnant and Lying-in Women, &c. 8vo. p. 27. 3d edit. Lond. 1785. — *R. G. Gastelier*, Traité de la Fièvre Miliaire des Femmes en Couches, 8vo. Mont. 1784. — *I. Pornieri*, Relazione e cura della Febbre Migliari, 8vo. Foligno, 1805. — *Schal et Hessert*, Précis Historique et Pratique sur la Fièvre Miliaire, 4to. Strasb. 1813. — *Monfalcon*, Dict. des Sc. Méd. t. xxxiii. — *Chomel*, Dict. de Médecine, t. xiv. — *F. E. Fodéré*, Recherches et Observat. &c. sur l'Eruption et la Fièvre sous le Nom de Miliaires, 8vo. Par. 1828. — *P. Rayer*, Theor. and Pract. Treat. on the Dis. of the Skin, transl. by *Willis*, 8vo. p. 350. Lond. 1835. — *Cazenave* and *Schedel*, Manual of Dis. of the Skin. Transl. with Addit. by *T. H. Burgess*, 8vo. p. 59. Lond. 1842.

MORTIFICATION. — See Gangrene.

MOUTH. — See Tongue and Mouth.

MUSCULAR STRUCTURE, Diseases of. —

Synon. *Muscular Tissue or System; Muscles. Muskeln, Heisch*, Germ. *Muscles; Musculaire Système; M. Tissu*, Fr. *Musculo*, Ital.

Classif. — General and Special Pathology. — Morbid Anatomy.

1. The muscular system has been usually divided into two orders or parts — into the *muscular system of organic life*, and that of *animal life*; the former being uninfluenced by the will, and therefore called *involuntary*, the latter being powerfully influenced by volition, and hence called *voluntary*. The power or property of animal bodies, usually denominated Irritability (*see that article*), is especially manifested by this system, and more particularly by the voluntary order of muscles, or those of animal life. Irritability may indeed be viewed as the vital manifestation most especially belonging to this system, although not confined to it in respect of its lowest grade, or that which I have called, in the article just referred to (§11.), "*insensible organic contractility.*" I have there also referred this function of muscles to the nervous system, or systems supplying and endowing them (§ 17. *et seq.*). Granting that the muscular structure derives its vital manifestations from the nervous system of organic nerves in the involuntary muscles, and from both that system and spinal nerves in the voluntary muscles, as there shown (§ 18.), it follows that disorders affecting the *functions* and *sensibility* of muscular structures are to be chiefly attributed to one or other of, or to both, these systems of nerves, comprising the nervous centres controlling them. In the brief review about to be taken of the alterations of muscular structures, I shall *first* notice those which are *functional*, or consist of alterations of sensation or motion; *second*, changes of *vital action*, and the *consequences* which result from them; and *third*, those which are more strictly *structural*, *physical*, and *mechanical*.

I. ALTERATIONS OF MOTION AND SENSATION OF MUSCLES.

2. i. The *contractility* of, or power of motion possessed by, muscles may be variously affected. 1st. By changes in the state of the organic nervous system, and of its vital endowment, as evinced chiefly by the involuntary muscular system:—2d. By states of the cerebro-spinal nerves, or of the spinal chord, medulla oblongata, or brain, as manifested chiefly by the voluntary muscles:—3d. By the circulation of blood in the muscular structure, and particularly by interruption of the circulation through either the arteries or the veins;—and, 4th. By the condition of the muscular fibres themselves.

3. 1st. That the power of motion, or contractility of muscles, both involuntary and voluntary, is greatly dependant upon the state of the organic nervous or ganglial system, is shown by the manner in which this power is affected by the numerous causes and pathological changes which powerfully influence—which either excite or depress—this part of the nervous system, as stated in the article IRRITABILITY. The actions of the heart are the chief index of the states of the nervous system of organic life in relation to muscular motion.

4. 2d. That the cerebro-spinal nervous system remarkably affects the muscular system, especially of voluntary motion, is demonstrated by many agents and morbid conditions; but the change in this system, whether exciting or impairing the power of muscular contraction, may be seated either in the nerves supplying voluntary muscles, or in the spinal chord, or in the brain. When a nerve is divided, or tied, the muscle supplied by that nerve is paralysed; when the spinal chord is divided, pressed upon, or severely injured, the parts supplied with nerves proceeding rom that part, and from the chord below the seat of injury, are paralysed; and when any part of the medullary, or white structure of the brain, is injured, the muscles more especially related to that part is paralysed, or removed from the influence of volition. In all these cases *sensibility* may be preserved, the stimulus of volition originating in the brain being no longer conveyed to the voluntary muscles, owing to lesion either of the white or fibrous structure of the brain, or of the spinal chord, or of the nerves. Owing also to irritation of either of these parts of the cerebro-spinal system, the muscular structures connected with them may be excited into inordinate action; and lesions of either, when slight, may merely impair, without entirely destroying, the voluntary motion of the muscles related to it.

5. Whilst the muscular system of animal life is thus subjected to the cerebro-spinal nervous system, it is not to be considered as under this dominion solely and entirely; for many phenomena connected with disease, and even with health, particularly during sleep, show that conditions of the internal viscera, or of the organs supplied either altogether or chiefly with the organic nerves, often affect the voluntary muscular system in a very remarkable manner. In all such instances, the change in this system is produced through the medium of the organic or ganglial nerves, which convey the impression or irritation to the brain, or to the spinal chord, or even merely to the roots of the spinal nerves. Thus, in cases of intestinal worms, or other visceral irritations, the morbid impression is not infrequently transmitted by the ganglial and sympathetic nerves, and ultimately expressed upon the voluntary muscles; and, in most instances, without any intermediate change in the brain, or even in the spinal chord itself, the impression being conveyed directly from the viscus affected, by communicating branches of nerves to the ganglia of the roots of the spinal nerves. Cholera, and several states of convulsion, are proofs of this mode of transmission of irritation from involuntary parts to voluntary nerves and muscles; and the phenomena presented by fœtuses without brains, or without both brains and spinal chords, are also illustrations of it, as shown in the articles CHOLERA, CHOREA, CONVULSIONS, &c.

6. Those inordinate actions of voluntary muscles, resulting from visceral irritation, are often so great as to be entirely beyond the control of the will, as in the diseases just noticed, or unless volition be very strongly exerted, as in some instances of hysteria. Most of the contractions of voluntary muscles that occur during sleep are induced by irritation of internal viscera; and the irritation may intermediately affect the brain and occasion dreaming, according to the nature of such irritation or impression, or it may be more immediately transmitted to the voluntary nerves and muscles ultimately affected, without in any way impressing the sensorium.

7. 3d. That the state of circulation of blood in muscles materially affects their contractile power has been fully proved by experiment and by pathological observation. It is not alone necessary that a sufficient circulation or supply of blood should exist in muscular parts in order to preserve their functions and organisation, but also that the blood be duly oxygenised or changed from the venous to the arterial state. It is fully shown by disease and experiment that interruptions of the changes produced by respiration on the blood impair or disorder the contractility of muscles, by affecting not only the cerebro-spinal axis, but also the muscles themselves; the highly venous or unoxygenated blood affects both the cerebro-spinal system and the muscular structure itself. The phenomena of asphyxia, of the advanced stage of pestilential cholera, and other diseases attended by interruption of the respiratory processes, fully illustrate this proposition.

8. When the principal artery of a limb is tied, and when the supply of arterial blood to the muscles is not kept up by a collateral circulation, the muscles are paralysed, the limb is benumbed, and it soon dies. When the venous current is entirely interrupted the limb is remarkably congested, livid, benumbed, paralysed, and as if locally asphyxied. On the other hand, when the supply of blood to muscular parts is free, abundant, and of a healthy and duly oxygenised quality, the contractile power of muscles is thereby increased and perpetuated.

9. 4th. It is evident that the original conformation, the organisation, and the nutrition, of the muscular fibre very materially affect the amount of its function, or of its contractile power. Muscular parts acquire increased vascularity and development with the frequency of action, and with these, augmented power; whilst they become pale, atrophied, weak, and at last almost paralysed

by disuse. These changes are chiefly owing to increased or diminished determination of nervous power and of arterial blood to these parts, according as their functions are discharged; but they are also owing to the states of nutrition consequent upon the amount of function performed.

10. Of the above causes of disorder of the contractile power of muscles, the most frequent are those which are seated in some portion of the cerebro-spinal system of nerves, and at the same time they are productive of the most manifest effects. This fact is demonstrated by disease. The *palsy* of a single or of a few muscles is generally caused by lesion of the motor nerve or nerves supplying them. Palsy of a portion of the body transversely, or *paraplegia*, is commonly produced by disease in or implicating the spinal chord; and palsy of one side, or *hemiplegia*, is occasioned by lesion of the brain. *Chorea*, *paralysis agitans*, or shaking palsy, the trembling or *shaking* caused by *mercury* or other *metals*, or by *age*, or by the abuse of *spirituous liquors*, generally depend upon the state of the spinal chord; and are often aggravated, as in chorea, by exertions of volition; the contractions produced by volition being weak, vacillating, and uncertain, owing to the morbid state of the cerebro-spinal system, or to the diseased movements caused by the state of this system. On the other hand, *tetanus*, *eclampsia*, *epileptic* and *hysteric convulsions*, *cramps*, &c., are manifestations in the muscles of irritation of some part of the cerebro-spinal system, more particularly of the spinal chord, the irritation either existing primarily in it, or being propagated to it by ganglial or other nerves, and thence reflected by motor nerves on the muscles.

11. ii. *Lesions of sensibility in muscles.*— These generally proceed from repeated, prolonged, or excessive contraction or exertion, and vary from the slightest feeling of lassitude or fatigue, to the excessive pain attending spasm and tetanus. In some forms, also, of rheumatism, severe aching pains are referred to the muscles, a *myalgia*, which may be owing to alteration of the sensibility of the nerves supplying the muscles.

II. INFLAMMATION OF MUSCLES. — SYNON. *Mysitis* (from μῦς, a muscle), *Myitis*, *Myositis*, Hildenbrand. *Muskelentzündung*, Germ. *Myosite*, Fr.

CLASSIF. — III. CLASS, I. ORDER (*Author*).

12. DEFIN.—*Severe pain of one or more muscles, with great difficulty or impossibility of contracting them, every attempt to contract them violently exasperating the pain, and with inflammatory fever.*

13. The muscular fibre is rarely the seat of inflammation. Indeed, it is doubtful whether or not it is ever inflamed, or can admit of being inflamed, owing to its organisation. Most probably, in those cases in which the muscles have been found exhibiting evidences of inflammation, the fine cellular tissue connecting the fasciculi of their fibres have been chiefly or solely affected, this being the most vascular part of their structure. There can be no doubt that some of the cases, which have been viewed as instances of myositis, have been cases either of rheumatism, in which true inflammation of the muscles does not exist, or of inflammation only of the cellular substance, surrounding or connecting muscles. In rare cases, however, the muscles, in the manner now stated, — chiefly as respects their connecting and surrounding cellular tissue, — are the seat of inflammation. The muscles are no farther affected in rheumatism than as respects their sero-fibrous sheaths and aponeuroses, which sometimes are implicated in that disease, the muscular fibre itself not being inflamed.

14. i. The *causes* of myositis are chiefly external injuries: bruises, wounds, sprains, excessive contraction, or over-exertion; sudden contraction of a muscle when volition has not been decidedly directed to the part, rupture of the fibres of muscles from over-exertion, or from contraction with imperfect volition; dislocations, lifting heavy weights; injuries or wounds of aponeuroses or tendons; and caries or other diseases of adjoining bones, especially of the vertebræ. The muscular fibre is very rarely inflamed from internal causes, or from influences affecting the vital conditions — the sensibility and vascular actions of muscles, — independently of external injuries, although the sero-fibrous sheaths of muscles and tendons, and aponeuroses are often inflamed in the course of *rheumatism*, owing to internal causes and influences affecting their vital states (see art. RHEUMATISM).

15. ii. The *symptoms* of myositis are extreme pain, soreness, and tenderness of a muscle or muscles, the pain being so much increased by contraction as to render all attempts at motion most difficult, or altogether impossible; increased heat, and indistinct or diffused swelling, of the part; sometimes subsultus of the tendons, or rigid contractions, or spasms of adjoining muscles; and always symptomatic inflammatory fever, with the usual constitutional phenomena of such fever.

16. With the exception of traumatic myositis, which may occur in all situations, the muscles which have been the most frequently inflamed are the psoæ, the tongue, and the diaphragm. The muscles of organic life are oftener the seat of inflammation than those of voluntary motion, particularly the urinary bladder, stomach, œsophagus, heart, &c.; still it is doubtful, even in these, whether or not the muscular structure is inflamed, otherwise than in being implicated consecutively. It is most probable that the inflammation originates, and is seated chiefly, in adjoining or connecting tissues, the muscular fibres being, from their organisation, incapable of experiencing those changes which have been usually termed inflammatory, although their functions are disturbed or interrupted by the disease in which they are implicated.

17. iii. The *consequences of inflammations of muscles* are chiefly *exudations of serum or lymph*, *softening* of the tissue, *induration*, *suppuration*, and *gangrene*. — *A. Exudations of serum or of lymph* may take place, in the course of myositis, between the fasciculi of fibres, or from the surface of the fibrous sheaths or aponeuroses enveloping muscles. Such is the case, more especially when muscular parts become involved in the course of diffusive or asthenic inflammations, particularly of the connecting or interposed cellular substance.

18. *B.* True *softening* of muscular textures in consequence of inflammation is rarely met with in the muscles of the skeleton, unless in some of the worst instances of diffusive, erysipelatous, or asthenic inflammations; and after poisoned wounds, and the inoculation of animal poisons. But it is

not infrequent in the muscular coats of the alimentary canal and urinary bladder, in conjunction with a similar change of their other coats, more especially in the course of dysentery and adynamic or enteric fevers. It is also observed secondarily in the diaphragm, particularly when this muscle becomes inflamed consecutively upon hepatitis; and more rarely even in the heart, during the course of malignant, continued, and exanthematous fevers, in cachectic diseases, and in the course of some cases of true carditis. In most of the instances of inflammatory softening of muscles, the colour of the part is changed to a more dark or dusky red than natural, or to a dirty brown. In some cases, however, the softened part has been paler than usual.

19. *C. Suppuration* is not a frequent consequence of myositis. It is most commonly met with in psoitis, but very rarely in the other voluntary muscles; and still more rarely in the substance of the heart. It occurs chiefly in a diffused form, infiltrating the cellular tissue connecting fasciculi, or interposed between muscles. It is thus met with in some cases of caries of the vertebræ, the disease of which has extended to the adjoining muscles and cellular substance; the matter which has been formed infiltrating this substance to a considerable distance. The exudation of serum, or of a sanious lymph, may, according to the states of vital power and of the circulating fluids, give rise to various changes — either to purulent collections, or to an offensive sanies, contaminating the adjoining parts, and sphacelating the cellular and adipose substances which it infiltrates.

20. *D. Gangrene* is sometimes observed consequent upon acute inflammation, occurring in an unhealthy habit of body, or during the progress of malignant fevers. It may destroy large masses of flesh; but this rarely takes place except some previous or co-existing change exists in the nerves or bloodvessels, supplying the gangrened part. In a case to which I was called many years ago by my friend Dr. J. Davies, of Hertford, gangrene of all the muscles of one lower extremity proceeded from inflammation of the iliac artery and vein associated with neuritis.

21. *E. Induration* or *hardening* of muscles, with change in their structure, is generally a result of slow inflammatory action, and of the exudation of lymph, thereby produced, into the cellular tissue connecting their fibres. It is met with in both the voluntary and involuntary muscles, in different degrees, and usually is attended by some swelling or enlargement. In the more advanced stages of this change the hardening is increased; the muscle becomes pale, loses its usual texture, and assumes either a leathery, a tendinous, or even a cartilaginous appearance, whilst, at the same time, its bulk is more or less diminished.

22. iv. The *treatment* of inflammation of muscular parts is in no respects different from that of sthenic inflammation of other structures. The usual antiphlogistic remedies and regimen should be enforced, with various modifications as to the extent, nature, and variety of the means to be employed, which the seat of the disease, its causes, and the constitution of the patient, will suggest. In cases where muscular parts are involved in inflammations of an asthenic or diffusive character, incisions are often required to prevent the contamination which would follow if the morbid matter formed in the part was not allowed a free exit. In all respects the treatment, both constitutional and local, should be conducted according to the form the disease assumes, and conformably with the principles fully developed in the articles *Inflammation*, *Erysipelas*, and diffusive inflammation of *Cellular Tissue*.

III. Changes of Muscular Structures not strictly referable to Inflammation.

Cassif.—IV. Class. III. Order (*Author*).

23. *A.* The *size* of muscles is much influenced by disease. — *a. Atrophy* of muscles is very common, in consequence of deficient nutrition, of a cachectic state of the system, of febrile action, of masturbation and venereal excesses, and of visceral and constitutional disease. In these circumstances the wasting is general; but it is often partial, as in the muscles of the legs and lower limbs, particularly in persons addicted to the excesses just mentioned, and in those who are lame. Disuse of the muscles of voluntary motion always occasions their atrophy. Long continued pressure has a similar effect, whether occasioned by tumours, dropsical effusions, or by swellings of any kind. In cases of this description large muscles frequently become expanded, and reduced to a membrane.

24. *b. Hypertrophy* seldom occurs in the voluntary muscles, excepting as a consequence of active exercise, and it then cannot be considered as a morbid state. It is met with in the involuntary muscles, as in the structure of the heart, stomach, and urinary bladder, and is then owing to morbidly increased action. If ever observed under other circumstances in the muscles of the skeleton, it is merely apparent, and occasioned by the deposition of lymph or adventitious structures between the muscular fibres.

25. *c.* The *colour* of muscles varies exceedingly, according to the abundance of hæmatosine in the blood, and to the quantity of this fluid, which they may contain. When the muscles are congested with blood, as is frequently the case in persons dead from asphyxia, drunkenness, tetanus, sanguineous apoplexy, narcotic poisons, &c., they are usually of a deep red or dark colour, the blood in the vessels being semi-fluid. In inflammatory and pulmonary diseases, they are either red or purple-red; in typhus, pestilential cholera, plague, yellow fever, and other pestilential maladies, they are bluish-red, or of a very duskyre In scorbutic persons they become, in places, of a dark brown colour. In all those diseases in which there is a deficiency of blood — in chlorosis, rickets, tubercular affections, dropsies, in many very fat or leucophlegmatic persons, and in visceral affections diminishing the assimilating processes, the muscles are more or less pale. When limbs have been disused, are lame, the joints anchylosed, &c., the muscles become not only atrophied, but also remarkably pale or even white. A pale state may also arise in muscles of the natural size, from great vascular depletion. Changes of texture are often attended with alteration in the colour; when the muscles are converted into fatty or adipocerous substance, when indurated from inflammation, and when affected with scirrhus, they often become unusually pale.

26. *d. Contractions* of muscles arise chiefly

from irritations affecting the origins of nerves supplying them, or certain parts of the encephalon in intimate correspondence with these nerves, or the ganglial nerves communicating with them. This alteration of muscles may also be connected with injury to, or with irritation or inflammation of, their tendons and aponeuroses. After long contraction, the muscle becomes atrophied, pale, and reduced to a state approaching to that of aponeurotic fibres. Remarkable contractions of the circular fibres of portions of the hollow viscera are sometimes found many hours after death, when these viscera have been shortly before dissolution the seat of severe irritation.

27. *B.* The *consistence* of muscles is extremely various. — *a.* Unusual *firmness* and *dryness* of the muscular tissue are sometimes met with in connection with change of texture, and more rarely without such change. Great firmness merely is generally attendant upon *contractions*, and these are associated with dryness, blanching, and some degree of atrophy when the contraction has been of some duration. Firmness and dryness, when considerable, are commonly local changes affecting chiefly muscles which have been long contracted, or pressed upon by swellings, tumours, &c. Isenflamm and Otto have, however, recorded instances in which the muscles were hard and dry throughout. These alterations are most frequently observed in very aged persons.

28. *b.* The consistence of muscles is often more or less *diminished* throughout, particularly in the advanced stage of adynamic, typhoid, and putro-adynamic fevers, in yellow fever, plague, scurvy, dropsy, and still more so in persons killed by lightning, or by a blow on the epigastric centre, also in cachectic diseases, and whenever the blood becomes vitiated by animal or other poisons. *Softness* and flabbiness in all these maladies are generally the results of impaired vital cohesion of the structure, and the colour of the muscles is, in these circumstances, generally deeper than natural, and is owing to the dark and morbid state of the blood. In tubercular and visceral diseases, in paralysis, certain chronic affections of the heart, in chorea, paralysis agitans, in lameness of limbs or anchyloses of joints, and in chlorosis and anæmia, the flabbiness or softness of the muscles is owing more to deficient circulation of blood in, and impaired nutrition of, the muscles, than to diminished cohesion; the muscles thus affected being of a pale, yellow, or fawn colour. Softness of muscles may be remarkable in the systems both of organic and animal life. I have met with it in both in all the diseases just enumerated, and even in the heart itself. I observed it in the heart associated with unusual pallor of the tissue in a case of chorea (see *Lond. Med. Repos.* vol. xv.). Softening sometimes occurs *locally* to a great extent in the vicinity of malignant affections, as in the lips and cheeks from watery cancer, and near carcinomatous and fungoid formations. In some marked cases of the kind, a large portion of muscle has been converted into a jelly-like, pulpy or fungous mass, constituting the *myomalaxia* of some authors.

29. *c. Fatty* or *adipocerous* degeneration of muscles. — *Myosteatosis*, *Myodemia* of Lobstein, and *steatosis* of Craigie — is rarely observed. In this state the fibrous structure of the part is entirely lost. Otto states that it occurs chiefly in the lower extremities after diseases of the knee-joint. In fat persons there seems to be an approach to this state, in the extreme paleness of the muscular fibres and the deposition of fat between them. This change has likewise been observed to occur in the heart by Laennec, Adams, Andral, and others.

30. *d. Fibrous*, *cartilaginous*, and *osseous transformations* of muscles are sometimes seen. Muscles which have been long retracted, particularly in old men, after rheumatism, often assume a *fibrous*, or even a *fibro-cartilaginous state.* M. Cruveilhier has found the muscles of the leg transformed to this state in a case of *elephantia.* A similar change may occur after fractures; the muscles nearest the fractured part being partially converted to a fibro-cartilaginous, a cartilaginous, and osseous structure, successively. Tavernier and Andral have observed ossification of muscles to a great extent. In most of the cases in which it has been seen, it has been limited to the cellular tissue between the larger fasciculi of fibres, or dipping into them from the fibro-serous expansions and aponeuroses, beneath which the ossific matter is deposited. As the osseous change proceeds the muscular fibres become atrophied, and they ultimately disappear. *Earthy* or *phosphatic concretions* are sometimes met with in the same situation, and in the cellular substance between the muscles, especially in gouty persons.

31. *e. Tubercular degeneration* is very rarely seen in muscles, and is met with only in the vicinity of scrofulous disease of the knee-joint, or of tubercular masses in the neck, arm-pit, mediastinum, &c.

32. *f. Malignant degenerations* of muscles are observed only secondarily. *Scirrhus* is thus met with, changing the muscular structure to a dense, whitish, fibrous substance, which subsequently runs into malignant ulceration. Cancer, in the *carcinomatous state*, and *medullary sarcoma* or *fungo-hæmatoid disease*, are sometimes found to invade the muscles, particularly the pectoral, to a considerable extent. *Melanoid formations* are also observed, but chiefly in the connecting cellular tissue.

33. *g.* Simple *cysts*, cysts containing *hydatids*, and others containing *small worms*, have been found in the substance of muscles. The former have been observed by Werner, Lobstein, Cruveilhier, and others; the last by Mr. Owen — the *trichinia spiralis* — who found this worm in subjects who had died of different diseases, of a low character.

34. *h. Fluids* are sometimes effused between the muscular fibres. These consist — 1. Of a *watery serum*, in some cases of dropsy and leucophlegmatia. 2. Of a *gelatinous matter*, infiltrated between the fasciculi and around the muscle, in acute rheumatism. 3. Of *puriform* or *sanious* matter, infiltrating the fasciculi of muscles, found only in rare instances, and in cases where puriform or ichorous fluids have been carried into the circulation from a distant situation; and — 4. Of *blood.* This last has been met with in various proportions, and has presented various appearances — fluid, semifluid, and dark, or almost black — in small specks, or ecchymoses, or in larger deposits. The effusion of blood between the muscular fibres has very rarely caused rupture of

them. To this alteration, the term *muscular apoplexy* has been applied by several French pathologists. It is very rarely met with in the voluntary muscles unless in scurvy and purpura hæmorrhagica. It is sometimes seen in the involuntary muscles, and even in the heart itself, after death from malignant, putrid, or pestilential fevers.

35. *i. Inflammation* and *obliteration of bloodvessels* are often followed by marked alterations of the muscles, which the diseased vessels supply. Thus, Cruveilhier and others have traced *phlebitis* from one of the principal veins of a limb to the branches proceeding from a muscle; purulent matter infiltrating it, and numerous small abscesses being interposed between its fasciculi. Obliteration of the bloodvessels is generally followed by *gangrene*, and particularly when the arteries are obliterated, unless a collateral circulation is formed. The gangrene following *ergotism* is chiefly occasioned in this way, although some change is also early produced by the morbid food on the nerves of the part. *Ulceration* rarely takes place in muscular structures, and chiefly in consequence of the pressure of tumours. In the involuntary organs it sometimes extends to and invades the muscular structure, in its progress from adjoining parts in which it has originated. *Malignant ulceration, softening*, and *destruction*, are often met with consecutively upon local malignant maladies, particularly in the pectoral muscles, and in the face.

36. *k.* The *physical and mechanical changes* to which muscles are liable consist of *rupture of their fibres, rupture of the aponeurotic envelopes*, or *luxations of muscles, wounds, contusions*, &c. The consideration of these does not fall within the scope of my work. I may, however, remark, that the *continuity* of the muscular tissue may be destroyed by external violence variously applied, by spontaneous rupture after antecedent softening, by suppuration and ulceration, and by violent involuntary contraction. When these accidents are not the result of previous organic change, they are generally repaired by means of a reddish jelly-like substance, poured out at the point of separation. This substance changes into a vascular and reddish cellular tissue, becomes subsequently compressed, of a lighter colour, more solid and less vascular, forming the medium of union between the divided parts, and restoring the continuity and functions of the injured muscle; but itself not consisting of true muscular tissue.

37. *l. Rupture of the fibres of a muscle* generally occurs upon any sudden, involuntary, or unconscious and violent contraction of it; is attended by extreme pain, sometimes by a crack or noise, and by inability to contract the muscle, each attempt to do so remarkably augmenting the suffering; and is followed by some swelling, and occasionally by ecchymosis. The *treatment* of these accidents consists of constant relaxation of the muscle, favoured by position, and of suitable bandaging of the part or of the limb, continued until reparation has taken place.

Bibliog. and Refer. — *Leuwenhoeck*, Microscopical Observ. on Muscles, in Philosoph. Trans. vol. xxvii. p. 529. 1712. — *Pouteau*, Mém. sur la Luxation des Muscles, &c.; dans Mélanges de Chirurg. et Œuvres Posth. t. ii. — *R. Whytt*, An Essay on the Vital and other involuntary Motions of Animals, 8vo. Edin. 1751. — *T. Simson*, An Inquiry how far the Vital and Animal Actions can be accounted for independent of the Brain, &c. 8vo. p. 10. Edin. 1752. — *A. Haller*, De Partibus Corporis humani Sensibilibus et Irritabilibus, 4to. Goet. 1753.; et in Oper. Min. t. i. — *Lieutaud*, Hist. Anat., &c. t. ii. p. 346. — *F. Fontana*, in Traité du Venin de la Vipère, t. ii. p. 239. 1781. — *Isenflamm*, De Musculorum Pathologia, 4to. Erlang. 1774. — *A. Ypey*, Observat. Phys. de Motu Musculorum Voluntario et Vitali, 8vo. Frank. 1775. — *Ploucquet*, De Myositide et Neuritide, 8vo. Tub. 1790. — *Schallhammer*, De Morbis Fibræ Muscularis, &c. 4to. Halæ, 1799. — *Dumas*, in Journ. Génér. de Méd. t. xxiii. p. 61. — *Emmanuel*, in ibid. t. xxiv. p. 5. — *A. Humboldt*, De l'Influence du Galvanisme sur l'Irritabilité des Muscles, dans Mém. de la Soc. de Méd. d'Emulation, t. i. 1797. — *Portal*, Anat. Médicale, t. ii. p. 412. — *Beclard*, Addit. à l'Anat. Gén. de *Bichat*, p. 214. — *M. Baillie*, Works, edit. by *Wardrop*, vol. i. 8vo. Lond. 1825. — *J. Thompson*, On Inflammation, &c. p. 152. — *Lobstein*, Compte rendu, &c. p. 32. Strasb. 1820.; et Traité d'Anat. Pathol. t. ii. p. 353. — *Otto*, Selt. Beobach. p. ii. p. 40. — *Ouvrard*, in Nouv. Journ. de Méd. Dec. 1822; et *Rostan*, in ibid. t. vii. p. 280. — *Wardrop*, in Trans. of Med. and Chirurg. Soc. of Lond. vol. vii. p. 278. — *Flaubert*, in Repert. Génér. d'Anat. Patholog. &c. t. iii. p. 124. — *V. N. ab Hildenbrand*, Institutiones Med. Pract. t. iii. p. 34. — *Andral*, Précis d'Anat. Pathol. t. i. p. 220. t. ii. p. 571. — *Tytler*, in Trans. of Med. and Phys. Soc. of Calcutta, vol. i. p. 117. — *J. Kennedy*, in Lond. Med. Repos. No. 124. — *A. N. Gendrin*, Hist. Anat. des Inflammations, 2 tomes, 8vo. Paris, 1826; t. ii. p. 188. (*Gives the best account of changes produced by Inflam. of Muscles*). — *Craigie*, Elements of Gen. and Pathol. Anatomy, p, 486. Edin. 1828. — *Chevalier*, in Lond. Med. and Phys. Journ. vol. lv. p. 95. — *Taddei de Gravina*, in Ann. de Méd. d'*Omodei*, 1836, t. lxxv. p. 494. — *W. C. Henry*, in Edin. Med. and Surg. Journ. vol. xxviii. p. 240. — *Cruveilhier*, Dict. de Méd. et Chirurg. Prat. t. ii. p. 568. et Anat. Pathol. livr. 2. et 17. *Rayer*, in Archiv. Génér. de Med. t. i. p. 493. — *Prevost* et *Dumas*, in ibid. t. iii. p. 88. — *Wright*, in ibid. t. xxx. p. 562. — *Ollivier*, in Dict. de Méd. 2d edit. art. *Muscles*.

NERVES. — Diseases of. — The various affections and structural lesions of nerves have been insufficiently investigated; and the existing state of knowledge respecting them is without precision — even as respects those which are the most frequently observed. Sciatica is a proof of this want of precise knowledge; for information is still required as to the state of the nerve in this affection. Cotugno, one of the earliest investigators of this complaint, imputed it to inflammation. This opinion was considered incorrect by later writers; and now it has been demonstrated, that certain states of sciatica actually proceed from inflammation of the sciatic nerve. In cases of morbid sensibility also of other nerves, it has not been shown whether the affection be functional merely, or whether it be really inflammatory, or dependent upon alteration of structure. And it is often difficult to determine how far the trunk of the nerve is implicated, or whether or not the affection proceeds entirely from disease at the origin of the nerve in which it is manifested. These remarks apply also to impaired or abolished function and sensibility of nerves. The real mischief may be seated at or near their origins, in their trunks, or in parts closely connected with either; and the same species of lesion, which, in either situation, may induce exaltation of sensibility or spasm, or convulsive actions of the muscles supplied by them, may in a higher grade produce loss of sensation, and in a still higher grade occasion loss of motion, or loss of either, or of both functions, according to the nature and precise seat of lesion. Since the researches of Sir C. Bell have appeared, some light has been thrown upon this department of pathology, still the light has been sufficient only to render our darkness more visible. In the brief account about to be given of diseases of nerves, I shall notice — *first*, the lesions of structure observed in them; — *secondly*, inflammations of nerves; — and, *thirdly*, morbid exalta-

tions of sensibility, or neuralgic affections; certain other disorders of nerves being comprised under different appellations, as *paralysis*, &c.

I. STRUCTURAL CHANGES OF NERVES.

CLASSIF. — IV. CLASS, III. ORDER (*Author*).

1. There are few parts of the animal body less subject to organic lesion than the nerves, particularly those of voluntary motion; and the lesions most frequently observed in them are chiefly the results of inaction, or of disease in parts connected with their origins, or of inflammations of some portion of their trunks.

2. *A.* The *size of nerves* varies materially; and the change may be either original or acquired. — *a.* Congenital or original *smallness* is not infrequent, either in a simple state, or conjoined with other morbid changes. It is generally connected with absence or imperfection of the organ to which the nerves thus affected belong. In internal dropsy of the head and hydrencephalocele, the cerebral nerves, whilst within the skull, are often very thin, as are the spinal nerves in the vicinity of the tumour in *spina bifida*. — *b.* True *atrophy* of the nerves, wasting or acquired smallness, is generally met with in particular nerves; it is seldom or ever general, excepting in a very slight degree, in general emaciation, or in very old persons. In hemiplegic and paralytic persons, the nerves of the paralysed parts are seldom very remarkably smaller than those which are capable of conveying volition. The nerves, however, of the organs of sense waste, shorten, or lengthen, &c., as the cause and consequence of diseases impairing or abolishing the functions of these organs. This has been most commonly remarked in respect of the optic nerves, which, alone, or with the optic beds and quadrigeminal bodies, have been found atrophied. Wasting of nerves frequently arises from pressure of any kind, as that of tumours and collections of fluid, &c., and is sometimes connected with neuralgic and epileptic affections. Wasting of the trunks of the nervi vagi has been observed in consumption, and of the ganglial nerves supplying the organs of generation some time after the disappearance of the menses.

3. *c. Irregular increase of the size* of nerves is rarely congenital; but is sometimes met with as a consequence of inflammation, dropsy, cancer. In such cases, single nerves are only affected; but the increase of size is sometimes three or fourfold. The ganglia and sympathetic nerves are not infrequently enlarged. LAUMONIER, PINEL, ROMBERG, LOBSTEIN, and DUNCAN, have found them unusually large in idiots, hemicephalic monsters, and diabetic patients; but MECKEL and OTTO, in their dissections after death from those diseases, have not observed this appearance. Dr. R. LEE has demonstrated the remarkable enlargement of the uterine nerves upon conception and during pregnancy. (*Philos. Trans.* 1842.) *Thickening* of the nerves is not an unusual consequence of chronic inflammation of their sheath and the cellular tissue connecting their fibriles. In several cases of this description, the nerve assumes a yellowish or greyish-yellow colour. (§ 4.)

4. *B.* The nerves may also present *anomalies of form, position,* and *ramification.* These are too numerous, in respect of every nerve, to admit of particularising them. — *a.* Their *colour* varies with their structural changes. When atrophied or softened they usually lose their gloss and whiteness, become somewhat opaque, grey, or yellowish, or greyish-yellow. Contused or inflamed nerves are more or less red throughout, or spotted or streaked with red. In ulcers and gangrened parts, they are usually more or less discoloured. In complete atrophy, or near a cancerous part, they present various shades of brown or rust-colour. In jaundice, they very seldom participate in the general discolouration.

5. *C.* The *consistence of nerves* is sometimes either diminished or increased. — *a. Diminished consistence* is most common: instead of being firm and elastic, the nerve becomes soft, withered, or shrivelled, easily torn, and appears as if macerated. In some instances, their sheaths are of their natural firmness, but their fibriles seem loosened, and somewhat separated from each other. In other cases, the medullary part of the nerve is remarkably softened and discoloured, appearing as if it had been dissolved by a solution of a fixed alkali; and, in the more extreme cases, so completely disorganised as to run out upon the division of the nerve like a jelly, or even like water. This state is analogous to that described under the name of pulpy disorganisation of the medullary structure of the brain, and proceeds from the same causes, one of the chief being a high degree of inflammation. Softening of the nerves may also be conjoined to *atrophy*. The nerves, in some parts, are sometimes entirely deprived of medulla, the hollow sheaths alone remaining. This occurs chiefly within the skull and spine in children, with imperfect developement of the brain and water in the head, or with hydrencephalocele, and spina bifida.

6. *b. Induration* of nerves is a rarer occurrence than softening, and seems to be chiefly attributable to a state of chronic inflammation, causing the deposition of a plastic lymph in the cellular tissue connecting their fibriles and gluing them more firmly together. Induration may also be conjoined either with *atrophy* or with *hypertrophy* of the nerve. The medullary substance is never actually converted into cartilage or bone.

7. *D.* The *continuity of nerves* may be broken, as in external injuries, wounds, &c., by which they may be partially divided, torn asunder, contused, their fibriles forcibly separated, &c. — *a.* If they be stretched gradually, as by soft tumours, swellings, &c., they often yield remarkably without their functions being destroyed. But when suddenly and forcibly extended, as by hard tumours, aneurisms, dislocations, &c., they may be torn, although this can rarely happen, without breach of continuity in the surrounding or more superficial parts. — *b.* When a considerable nerve is *wounded*, neuralgic and sympathetic affections sometimes arise in addition to the necessary paralysing of the part which it supplies, and to the usual phenomena proceeding from such injuries, as redness, swelling, effusion of coagulable lymph and reunion. If a nerve be completely *divided*, both extremities swell, particularly the upper; the more distant or separated portion of nerve becomes somewhat thinner, and the lymph effused between the divided ends unites them both into a more or less large and solid knot, consisting of cellular tissue, into which new and irregularly disposed nervous threads are produced after some

time. There is no part of the soft solids which are more disposed to unite than nerves, even although the division has been made with loss of a considerable portion of the nerve, or their ends have been far removed; but the union is always made through the medium of a cellular tissue produced from the divided ends, into which medullary fibriles shoot irregularly some time afterwards. Even after amputation the divided extremities of different nerves will unite in this manner, forming a loop. When union does not take place, the divided ends cicatrise with a permanent swelling, with loss of motion and sensation of the part supplied by the divided nerve. After amputation the ends of the nerves appear swollen, inflamed, spotted or red, from the blood effused between their fibriles at the divided surface. This state subsides into a greyish, thick, firm, and fibrous-like knob, from which delicate nervous fibriles proceed, serving as nervous ramifications to the surface and divided parts.

8. *c. Contusion* of a nerve is followed by effects varying with the severity of the injury. When the contusion is slight, extravasation of blood in the cellular tissue connecting the nervous fibriles is the chief consequence; if it be more violent, the fibriles themselves may be crushed. In the first case, severe pain and numbness in the course of the injured nerve, and temporary or partial paralysis are the results, which generally cease after a time. In the second the effects are more severe, and the palsy more permanent.

9. *d. Punctures* are amongst the frequent injuries to which nerves are liable. They occasion extreme pain, which is often protracted long after the infliction of the injury, is extended in the course of the nerve, and is sometimes accompanied with spasms, tremors, or convulsive motions of the muscles supplied with the punctured nerve. Cases illustrative of this lesion have been recorded by Sabatier, Wilson, Swan, Bosquillon, and others. Punctures often occasion a circumscribed swelling of the nerve, with slight effusion of blood in the cellular tissue connecting the fibriles, and in the enveloping neurilema. It has been shown by Wolff, Descot, and Béclard, that, when the acute inflammatory symptoms consequent upon this injury have subsided, and when the effused fluids are absorbed, there still remains in the situation of the puncture a hard, opaque, and circumscribed enlargement, of a fibrous consistency, formed by a thickening of the cellulo-fibrous tissue of the nerve. This change in the part may occasion severe pains of the nerve, which may not be subdued until the nerve is divided in the situation of the puncture.

10. *e. Section of a nerve* may give rise to severe suffering, whether it be complete or incomplete. When the division is *incomplete*, severe pains, as in cases of puncture, are felt, and are remarkably increased by attempts to contract the muscles supplied with the partially divided nerve; perfect repose, appropriate bandaging, and, if these fail, complete division of the nerve, being the chief means of relief. *Complete* division of a nerve may occasion severe pain, which, however, is generally much less violent, or prolonged, than when the nerve is punctured or partially divided. When the section is complete, the acute pain attending it is instantly followed by insensibility and loss of motion of the parts supplied by the divided nerve; the divided ends of the nerve undergoing the changes described above (§ 7.).

11. *f. A ligature* drawn tightly around a nerve instantly produces effects analogous to division of it. After a time, the ligature occasions swellings above and below it, and close to it, that above being the greater. When the ligature causes division of the nerve, the ends remain in contact, surrounded by the inflamed cellular tissue, and by coagulable lymph, which soon becomes organised. Union takes place, as after division from a wound; but the enlargement, especially that which was above the ligature, still continues more or less. Ligature of nerves sometimes occasions very severe or even violent effects, but not so generally as commonly supposed.

12. *g. Wounds*, even when very small, occasion most severe effects when a portion of a foreign body remains imbedded in a nerve. Very interesting cases of this description have been published by Denmark, Jobert, Descot, Jeffreys, &c., in the works referred to in the Bibliography. These effects are especially severe when the wound has cicatrised, the foreign substance lodged in the nerve occasioning the most painful irritation in the course of the nerve and its ramifications, or violent neuralgia, with spasms of the muscles supplied by it. In some instances, tetanus has been the result.

13. *h.* A nerve may be involved in a *cicatrix* following a wound, amputation, or burn; and become the seat of intense pain or irritation, owing to its exposed, or insufficiently protected state. The actual or potential *cautery* — the latter even when performed with a caustic alkali,—may, either previously, or subsequently, to the cicatrisation of the part, occasion very severe effects when the branch of a nerve is involved in the injury. M. Frère (*Revue Méd.* Mai, 1839, p. 207.) has recorded an instance of an issue made by the caustic potash having thus been followed by severe local effects, which terminated in fatal tetanus. But this is a very rare, if not a singular occurrence.

14. E. *Lesions of nerves of a malignant nature* have not been satisfactorily observed; nor have they been found to form primarily in nerves. Otto and others have remarked, that the medulla has appeared more or less diseased in the vicinity of carcinomatous or cancerous swellings or ulcerations; the nerve being discoloured in parts, hardened, swollen, and knotty, and degenerated in its structure to a greater or less extent throughout, both in its sheath and medulla.

II. Inflammation of Nerves.—Syn. *Neuritis, Nervorum Inflammatio; Neurite*, Fr. *Die Nervenentzündung*, Germ.

Classif.— III. Class, I. Order (*Author*).

15. Defin. — *A violent, sharp, lacerating pain in the situation of a nerve, with a feeling of numbness, increased by slight pressure, and often attended by greater fulness than natural, sometimes by redness, in the course of the nerve, and by inflammatory or irritative fever.*

16. Inflammation of nerves has been generally passed over by writers on practical medicine. Boerhaave remarks: " Nemo forte unquam vidit inflammationem in nervo; hæc vero si contingat, in sola *tunica vaginali* hæret." (De Morb. Nerv., p. 265.). That the inflammation is seated chiefly in the neurilemma cannot be doubted;

but it is not the less an affection of the nerves; and that it is, in a most demonstrable shape, a not very infrequent disease, will be acknowledged by most experienced pathologists. Although it is not manifest that several affections of nerves, such as neuroma, cramps, partial loss of sensation, or of motion, sciatica, and the severe attacks of pain usually termed neuralgia, proceed from inflammation implicating a trunk or branch of a nerve, yet there is much reason to infer that such is actually the case in some instances, and more frequently than has been admitted, although the inflammation may not be seated or manifested exactly as it is in the more unequivocal instances of the disease to which the term has been generally conceded. It was contended by Cotugno, with much reason, that the trunk of the sciatic nerve is always more or less inflamed in sciatica; and I will endeavour in the sequel to show that neuroma or painful tubercle is the consequence of a chronic inflammation of the sheaths of the nervous fibres, and of the connecting cellular tissue.

17. i. Acute Inflammation of Nerves. — *Neuritis acuta; Neurilemitis, neurilitis,* Auct. *Neurilemmatitis*, Hildenbrand. — Acute neuritis is rarely met with in a primary or idiopathic form, or independently of wounds or external injuries; but not so rarely as was very generally supposed. The researches of Martinet, Gendrin, and Dugès, have shown that the changes in the nerve, in the idiopathic and traumatic forms of the disease are the same; and that these changes are not limited to the neurilemma, but extended to the nervous substance itself, which was found in several cases (Martinet's 4th, 5th, 6th, and 10th cases), of a dark-red colour, softened, and even "injected by very manifest vessels." Indeed, as M. Ollivier has remarked, there is no reason that the nervous substance should be less capable of inflammation in its finer ramifications than in its central masses. However, it cannot be disputed, that the chief marks of inflammatory action are seated in the neurilemma. The differences in the symptoms caused by inflammation limited to the one, from those produced by inflammation extending to the other, have not been shown; although Hildenbrand supposes, that when the pulp or substance of the nerve is affected — *neuromyelitis* — the symptoms are less acutely and distinctly evolved than in neurilemmatitis, and are attended by nervous symptoms indicating more acute sensibility, and greater disposition to spasm. This distinction is, however, extremely doubtful and imperfect; careful post-mortem investigation is required to elucidate this subject, but opportunities of determining it are very rarely afforded the pathologist.

18. *A.* The *symptoms* of acute neuritis are a lacerating, sharp, or lancinating pain in the situation of a principal nerve or branch of a nerve; attended by a sense of numbness, generally following the course of the nerve affected and of its branches; exacerbations of the pain after slight and variable remissions, and upon the slightest touch or pressure, or upon moving the muscles supplied by the affected nerve; and, in some cases, numbness, or partial or even complete palsy, of parts below the seat of pain, which in these also may be acute, remitting and lancinating. Even when the pain is most continued, the slightest touch may exasperate it; whilst very firm pressure above, but not upon, the affected part of the nerve, will assuage it. When the nerve is superficial, as in the extremities, a longitudinal swelling or hardness may be detected in the seat and course of the nerve. The heat of the part is increased, and a burning sensation is also often felt in it. The usual phenomena of symptomatic inflammatory or of irritative fever are generally present, in varying grades, according to the intensity of the local affection, the size of the nerve implicated, and the temperament, habit of body, and visceral conditions of the patient.

19. Neuritis sometimes occurs in the *puerperal state — Neuritis Puerperalis,* — and attacks chiefly either of the lower extremities soon after parturition. M. Dugès (*Rev. Méd.* Aout, 1824), first directed attention to the disease as it appears in this state; and since that time I have seen three or four cases of it. The first of these I attended in 1825 with my friend Dr. John Davies, now of Hertford. It was complicated with both phlebitis and artereitis, and terminated in fatal gangrene of the whole limb; the nature of the disease being further shown by the examination after death. M. Dugès has endeavoured to distinguish *five varieties* of puerperal neuritis. 1. The simple or circumscribed. 2. The œdematous. 3. The phlegmonous. 4. The œdemato-phlegmonous; and — 5. The gangrenous. It is evident that these varieties are chiefly the result of the association of neuritis with inflammation of either the veins, the lymphatics, or the arteries; my own experience proving that these associations are even more frequent, in the puerperal state, than the simple form of the disease.

20. M. Dugès attributes the first or simple variety of puerperal neuritis to the pressure of the gravid uterus on the pelvic nerves. It is usually seated in the sciatic nerve; and occasions acute lancinating pain; and in the more severe cases to partial palsy of the limb. M. Dugès states that this variety is readily removed by warm baths; but the slighter cases which are thus remedied cannot amount to actual inflammation, or to any thing beyond congestion of the vessels of the nerve, or of the parts surrounding it. The presence of fever in connection with the pain in the nerve, is not, in the puerperal state, sufficient proof of the existence of inflammation, as in nervous and irritable females in this state, febrile commotion is often readily excited by pain.

21. The *phlegmonous variety* of M. Dugès is in all respects the same as the common form of the disease already described (§ 17.). He characterises it in the puerperal state nearly as follows: — 1. The pain follows the direction of the nerve, particularly the crural, or the more superficial nerves of the lower or upper extremities, and is more acute and insupportable than in other inflammations. 2. The swelling as well as the pain proceeds in the direction of the nerve, is dense, unequal, and precedes any external redness. 3. The pain and swelling in the seat of the nerve are of longer duration than in common phlegmon; the pain always precedes the swelling, and the chills and rigors accompanying their commencement are of longer duration, and more severe, and the consequent fever is more intense.

22. The varieties of neuritis which M. Dugès has denominated the *œdematous*, the *œdemato-phlegmonous* and the *gangrenous*, are complica-

tions, as I have above suggested, of neuritis with either phlebitis or artereitis, or both. In the case already alluded to (§ 18.), neuritis was associated with inflammation of both the veins and arteries.

23. *B.* The *diagnosis* of acute neuritis from *neuralgia* is often difficult. Some authors have supposed that the latter depends upon inflammation of the nerve; and it is not improbable that, in some of the cases characterised by a more or less persistent pain in the nerve, and by a limitation of the pain to a single nerve or its ramifications, some degree of inflammation may exist in a part of it, or at its origin. Generally, however, the presence of fever, of fixed and constant pain in the situation or course of a nerve, of tension, dense swelling, and tenderness on pressure, of partial palsy of, and increased pain on contracting, the muscles supplied with the affected nerve, &c., indicate inflammation; whilst the absence of fever, the erratic and intermittent character of the pain, its subsidence upon firm pressure, mark its dependence upon irritation in a related part, or upon some other cause.

24. *C.* The *appearances in fatal cases* consist chiefly of redness, more or less marked, of the affected nerve, proceeding from injection of the capillaries of the neurilemma, or of the cellular tissue connecting the fibriles; of minute punctiform and numerous ecchymoses; of sero-sanguineous, or even of puriform, infiltration of the fibro-cellular envelope. In addition to one or more of these changes, the size of the nerve is increased, most frequently without any appreciable change of consistence, but occasionally with more or less softening, of the affected part. BICHAT found numerous small varicose dilatations of the veins in the sciatic nerve of a person who had experienced severe pain in this nerve; and VAN DE KEER found the sciatic softened, to a deliquescent pulp, of a greyish dirty red colour, in the midst of which were hard granulations. The neurilemma was thickened, red interiorly, opaque and white externally, but granulated and more or less injected. These changes were manifestly consequent upon inflammation, and confirmatory of the opinion of COTUGNO, who attributed, too exclusively, sciatica to inflammation of the nerve.

25. ii. CHRONIC NEURITIS — *Neuritis diuturna* — in certain of its conditions or results, has not been satisfactorily elucidated. *Neuroma*, or the tumour which is sometimes found in a nerve, is undoubtedly a consequence of chronic inflammation of the tumified part, inasmuch as the changes observed in it are similar to those which result from chronic inflammation in other parts of a like structure. *Ulceration* may also be adduced; but it is very rarely observed — never, perhaps, limited to a nerve; and only when a nerve participates in the ulceration of surrounding parts. When this is the case, the suffering thereby occasioned may require the removal of the diseased portion of nerve, or its excision, as advised by M. OLLIVIER; and, in some extreme cases, when the bone becomes affected, or adjoining parts much disorganised, even the amputation of a limb may be rendered necessary, as in a case adduced by Mr. SWAN, in which the popliteal nerve and surrounding parts were extensively ulcerated, excision of a portion of the nerve having been found inefficacious.

26. *A.* The only *form*, or *result*, of chronic neuritis that has been satisfactorily investigated, is *neuroma*, or painful tumour of a nerve. Numerous writers have noticed this kind of tumour, and, amongst others, CAMPER, BOERHAAVE, GOOCH, HOME, SPANGENBERG, PETIT, CHAUSSIER, DELPECH, and MECKEL. But J. FRANK, ARONSSOHN, DESCOT, and W. WOOD, have more fully investigated its nature than other writers. M. ODIER, of Geneva, applied to it the term neuroma. A modification of the same disease, or painful tumours of the sub-cutaneous or smaller nerves, has been fully described by Mr. W. WOOD, under the name of "*painful sub-cutaneous tubercle.*" These tumours,—whether formed upon small sub-cutaneous nerves, or upon large or small nerves of the extremities or of the trunk,—are essentially the same, but vary in structure, size and appearance, with the activity or grade of vascular action which produced them, and with the particular tissue of the nerve that has been principally affected. The tumour is sometimes round, but more frequently oval or elliptical. Its size varies from that of a pea or bean to that of a turkey's egg, but it rarely exceeds that of a hen's egg. More than one tumour is often found in the same case. It is met with at all ages; but of sixteen cases, four were in persons above forty-six years of age, and twelve in persons under that age. Of twenty-four cases, fifteen were stated to have occurred in men, and six in women. The disease is met with chiefly in the trunks or larger branches of the nerves of the extremities, particularly the upper, and near the elbow-joint. It occasionally occurs in the internal parts of the body; and, if these parts, and the size and distribution of the nerves supplying them, admitted as readily of examination as the extremities, it might be found more frequently in them, constituting the cause of some painful internal complaints. Of the cases adduced by Mr. WOOD, sixteen were seated in the upper, and five in the lower extremities; one in the neck, one in the thoracic cavity, and one in several parts. When once formed, the tumour generally increases more or less rapidly, and is rarely much influenced by treatment, but it seldom attains a very considerable size under two or three years. It may, however, remain stationary as to bulk for a very considerable time. The sub-cutaneous tubercle is particularly slow in its growth, rarely attaining a greater size than that of a bean, and often remaining without increase of bulk for several years.

27. *a.* The *diagnosis* of neuroma when superficial is not difficult. The tumour is most frequently hard and firm to the touch, occasionally elastic, and admits of motion in a lateral direction, but not upwards or downwards, or in the direction of the nerve. The skin is moveable over it, and is natural in appearance. When it is very large, the cutaneous vessels, particularly the veins, are enlarged, and the skin is somewhat livid in rare instances. The tumour is extremely painful on the slightest pressure; the pain extending to the parts supplied by the nerve — to the ring and little finger when the ulnar nerve is the seat of the disease. If a blow is received on it, the pain darts through different parts of the body. In three cases, referred to in the references, epileptic fits were distinctly caused by these tumours, and were cured, in two of them, when the tumours were

removed. In some instances the pain is not severe when the parts are kept at rest; but, in most, tickling or tingling, creeping or numbing sensations, or a combination of these, are felt in parts near or below the tumour; and, in many, a most excruciating pain, independent of, but much increased by pressure, exacerbated at intervals, is complained of at a distance from it, but in the direction of the trunk or branches of the nerve affected. The powers of sensation and of motion are, however, seldom impaired, but motion aggravates or brings on the pain; and prickling, accompanied or alternated with numbness, is felt in the limb, and severe pains dart in the direction of the nervous branches. In the smaller forms of the disease, which Mr. W. Wood denominates "painful sub-cutaneous tubercle," paroxysms of pain occur often without any apparent cause, and after irregular intervals, occasionally of some weeks' duration. In most instances, the severity of pain produced by pressure, the extension of it in the course of the nerve, the lancinating pains associated with numbness, and the increased suffering caused by attempting motion of the tumour in the direction of the nerve, of which it does not admit, are sufficiently diagnostic of the nature of the disease.

28. *b.* Tumours of the nerves, when carefully *examined* after death, or after removal by operation, present different appearances in different cases, owing probably to the originating seat of the disease, and to the state and progress of it. Mr. W. Wood remarks, that it is often difficult to determine in what particular tissue the diseased action had commenced. In some cases this action appears to have begun in the cellular tissue in the proximity of the nerve, to which it had gradually extended, so that, in its progress, the nerve and its coverings had become completely involved in the disease; but, unless tumours which commence externally to the sheath of the nerve shall implicate the nerve itself, they cannot be considered as cases of neuroma. I believe, however, that the diseased action under consideration commences most frequently in the neurilemma, forming the external sheath of the nerve or its connecting cellular tissue; or in the minute processes of neurilemma sent off from the general sheath to envelope the several nervous fibriles which form the nerve. In rare cases, the tumour consists chiefly of a cyst containing a fluid; in other cases, it is partly solid and partly fluid; but much more frequently it is solid throughout. The solid part assumes different degrees of consistency, and presents a different colour and appearance in different cases, and even in different parts of the same tumour. In some, the whole mass is firm, of a whitish or yellowish colour, and of a fibro-cartilaginous appearance, very much like nerve, but harder, and somewhat more shining; the fibres running either in a serpentine or parallel manner, with interlacing fibres. In others, one part is firm and of a reddish colour, and another part is cellular, the cells varying in size, and some being empty and others containing a fluid or a soft medullary-like substance. Others again consist of a number of small lobes, closely pressed and connected with the diseased nerve. Some are fatty, or tubercular, or consist chiefly of coagulated albumen. Nearly all present the appearance of having a firm, dense sac, shining externally, and seemingly formed of the altered neurilemma. This covering is either loosely or very intimately attached to the contained parts by cellular tissue.

29. The nerve is sometimes sound as it enters, or emerges from, the tumour; but it is oftener more or less diseased for a little distance above and below, being somewhat redder than natural, and thickened. The nerve can be traced distinctly to the diseased part, where the fasciculi, being separated from each other, run into the substance of the tumour, where they are either lost, or traceable through it, or near its surface. When, however, the tumour is very large, the nervous fibres often cannot be traced through it; they being so completely altered, or atrophied, or entirely removed by the morbid deposition, or hypertrophy of certain elementary parts of the mass. Some writers have considered this tumour of nerves as being of a scirrhous or cancerous nature; but that such is not the case is proved by the circumstances — 1. of its not invading the adjoining tissues nor implicating the skin, however large it may be, or however long it may have existed — 2. of the complaint not returning when the tumour has been removed.

30. *B.* These tumours sometimes closely resemble the oval tumours which often form on the extremity of a nerve after amputation. These latter tumours are frequently three or four times as large as the nerve on which they form, but of the same colour, of a firmer consistence, and of a different structure. The texture of the tumour is fibro-cellular, and dense, in which the nervous filaments lose themselves or become indistinct, probably by being wasted in proportion to the hypertrophy and induration of the cellular tissue of the affected part of the nerve, manifestly the result of chronic irritation or inflammation.

31. *C.* In some cases, consequent upon chronic inflammation, the cellular tissue forming the nervous sheath, and connecting the nervous fibriles, has been found infiltrated with serum, lymph, or sero-albuminous or sanguineous fluid, and rarely with purulent matter unless in acute or sub-acute cases. These changes have been observed chiefly in the ischiatic and other large nerves. Bony and earthy concretions have in rare instances been found in the cellular tissue connecting the nervous fibriles, but exterior to the medullary matter. These have probably resulted from a state of chronic inflammation, or have been the residua after partial absorption of morbid deposits.

32. *D.* Inflammation and its consequences may occur in either the cerebro-spinal or the ganglial or soft nerves, probably in the latter more frequently than in the former, but, owing to the situation of the ganglial nerves, and the marked peculiarities of their structures, either escape detection, or give rise to different phenomena and to different lesions in them from those observed in the cerebro-spinal nerves. When the ganglial nerves are inflamed, they are generally enlarged, of a lively or deep red; sometimes softened, and occasionally firmer than natural. These are the only changes in this particular class of nerves which I have observed.

33. iii. The causes of acute and chronic neuritis are chiefly those productive of inflammations of other tissues and organs. The circumstances

which *predispose* to the disease have not been fully elucidated, owing to the infrequency of it, and to its being confounded with other maladies, as with rheumatism, neuralgia, &c. My own observation induces me to infer that all lowering influences, copious hæmorrhages, prolonged pressure, and vicissitudes of temperature, humidity, and electrical states, of the air, both favour and more directly produce it, particularly when aided by the application of cold in any form, by wet or damp clothes, by sitting or lying on the ground, or on cold stones, or on damp seats or couches, by exposure to malaria, or to foul air, or other contaminating agents, by inordinate exertion, by suppression of accustomed discharges, by injuries, wounds, bruises, contusions, sprains, or operations, and by any local source of irritation. The idiopathic form of neuritis is occasioned chiefly by the same causes that give rise to rheumatism. The puerperal state certainly favours the developement of it, in its severest forms; the circumstances which are most efficient in causing it being then frequently in concurrent operation, particularly soon after delivery, when it may be complicated with phlebitis, and even also with artereitis, as in the case above alluded to (18.).

34. iv. The prognosis in neuritis depends chiefly upon the circumstances in which it occurs. In the puerperal state, or when associated with inflammation of either of the circulating systems, it is a serious and even dangerous disease; the latter chiefly on account of the complication, and the exhausted or otherwise diseased state of the patient. The prognosis should be equally unfavourable if it occur in the course of fevers, or in connection with other maladies, or even in a bad habit of body, in all which circumstances it is most apt to appear. In a large proportion of the cases recorded by MM. Martinet, Dugès, and others, the disease, in its acute form, terminated fatally when it thus appeared; the inflamed portion of nerve being either injected, enlarged, red, softened or infiltrated with serum or with puriform matter (§ 23.) The simple or uncomplicated disease, occurring in a previously healthy person, and the chronic form, especially in the state of neuroma, and admitting of an operation, is most frequently removed by judicious treatment.

35. v. Treatment.—*a*. My own experience leads me to agree with the remark of Hildenbrand, that acute neuritis is never resolved by a recourse to bloodletting and antiphlogistics alone. That local bloodletting — much more rarely, general bloodletting — is required, according to the circumstances of the case and of the patient, is admitted; but additional means are also required, and should be adapted to these circumstances. Local depletions and fomentations; the more chologogue purgatives, as calomel, &c.; and anodynes, particularly opiates with calomel and camphor, or with the acetate of lead, or with the oxyde of bismuth; are most applicable to the more sthenically acute cases: but when the disease is associated with other serious maladies, or when it occurs in a cachectic state of the frame, or with asthenic characters, actively restorative agents are generally then required, even whilst local depletions and anodyne fomentations are being employed; and, in some cases, they should be most energetically prescribed in order to be successful, and be combined with the most powerful narcotics, the functions of the several emunctories being at the same time duly promoted, and morbid or effœte matters eliminated from the circulating fluids.

36. *b*. If the disease pass into, or primarily assume, a *chronic state*, alteratives conjoined with tonics, as the preparations of cinchona with alkaline carbonates or the liquor potassæ, and iodide of potassium; camphor with opium, or with the extract of aconite; blisters in the course of the diseased nerve, if it be deep-seated, and kept discharging for some time, and stimulating and alterative embrocations (F. 296. 311.), appear to be most successful. To some of these chronic cases, the treatment advised for *neuralgia* may be of service.

37. *c*. In cases of *neuroma* and painful subcutaneous tubercle these means will generally fail, and even the narcotic alkaloids applied locally are not more serviceable. In these cases, the extirpation of the tumour becomes necessary; and even, in certain circumstances, amputation of a limb may be required. Mr. Wood states, that in twenty-four cases of neuroma, the following were the results: — in eight cases the tumour was successfully excised; in two, the patients died after the operation; in four, amputation was successfully performed; in three, no operation was attempted; in three, the tumours were accidentally met with on dissection; in two, the disease was seated in internal parts of the body; in one, the tumour was laid open in order to bring on suppuration, but the patient died of quotidian intermittent; and in one, the disease was cured by destruction of the nerve by caustic.

38. III. Lesions of Sensibility and Function constitute the third class into which the diseases of nerves may be divided. As the principal part of alterations of sensibility, or that consisting of morbid exaltation of sensation, has very generally had the term *neuralgia* imposed upon it, and as this morbid condition has been usually discussed under this name, it may be considered in a separate article, without the relation between it and other diseases of the nervous system being in any way interrupted by this mode of treating it. And as those painful affections of nerves which have been considered to exist independently of inflammations, and to which the name neuralgia has been given, are somewhat diversified in character and severity, the more general appellation of Neuralgic Affections may be applied to them. The disorders of function to which nerves are liable, especially losses of the powers of transmitting sensation and volition, and their agency in producing spasms, &c., being more advantageously treated of in connection with other and very intimately related lesions, are therefore comprised in those articles that are devoted to the consideration of diseases which are thus characterised, and which chiefly consist of losses and of exaltations of sensation and of muscular contractions, or of impairment or irregularity of sensation and motion. (See art. Paralysis, Chorea, Convulsions, Irritation, Hysteric Affections, &c.)

Bibliog. and Refer. — 1. *Inflammation of Nerves.* — *Boerhaave*, Prælect. Academ. de Morb. Nerv. 2 vols. 8vo. Venet. 1762. — *Cotunnius*, De Ischiade Nervosa, 12mo. Vien. 1770. — *Ploucquet*, De Myositide et Neuritide, Tub. 1790. — *Nasse*, De Neuritide, 4to. Halæ, 1801. — *Bichat*, Anat. Générale, t. i. p. 177. edit. 1801. — *Bettoli*, in Giorn. della Soc. Med. Chirurg. di Parma, vol. ii.

p. 256. — *E. Home*, in Transact. of Society for Improvement of Med. and Chirurg. Knowledge, vol. ii. art. ii. — *Reil*, Fieberlehre, b. iv. p. 56. — *D. Pring*, A View of the Relations of the Nervous System in Health and Disease, 8vo. p. 168. Bath, 1815. — *Martinet*, Mémoire sur l'Inflammation des Nerfs, Paris, 1824; and in Révue Médicale, t. ii. p. 329. 1824.— *Dugès*, Sur le Neurite Puerperale, in ibid. t. iii. p. 157. 1824. — *J. Swan*, On the Treatment of Morbid Local Affections of Nerves, 8vo. 1820; and On the Anatomy, Physiology, and Pathology of the Nervous System, 8vo. Lond. 1822; and Treat. on Dis. and Injuries of Nerves, 8vo. Lond. 1834.— *Lobstein*, De Nervi Sympathetici Fabrica, Usu, et Morbis Comment. p. 55. Paris, 1823. — *Descot*, Sur les Affections locales des Nerfs, 8vo. Paris, 1825. — *V. N. Ab Hildenbrand*, Institut. Practico Medicæ, &c. t. iii. p. 18. —*Van de Keer*, Sur Neurilemitis, in Journ. Univers. des Sc. Méd. t. xxv. p. 64., et t. xxx. p. 328. — *A. N. Gendrin*, Histoire Anatom. des Inflammations, t. ii. p. 142. — *Olivier*, in Dict. de Méd. 2d edit. art. *Nerfs*. — *Cruveilhier*, Anat. Patholog. livr. — *Brown*, in Glasgow Med. Journ. vol. i. p. 132. — *P. Jolly*, in Dict. de Méd. et Chirurg. Pratique, art. *Neurite*.

ii. *Lesions of Consistence, Continuity, &c.* — *Galen*, Methodus Medendi, l. vi.—*Paulus Ægineta*, l. iv. c. 54.—*Oribasius*, Synopsis, l. vii. c. 22. — *Avicenna*, Canon. l. iv. Fen. iv. Tract. 4. çap. i. — *Scultetus*, Observ. no. 64. (*Terebinthina et Cera pro punct. nerv.*).—*Morgagni*, De Sed. et Causis Morb. Epist. lii. 31. — *Monro*, On the Structure and Functions of the Nervous System, p. 81. 83. —*Cruickshanks*, Experiments on the Nerves, Philos. Transact. 1795. p. 120. — *Haighton*, in ibid. p. 190. — *Michaelis*, Ueber die Regenerat. der Nerven. Kussel, 1795.—*Autenreith*, Observat. in Hydrothor. Viror. Tub. 1809. — *Lobstein*, Opus Citat. p. 165.—*Denmark*, in Transact. of Med. and Chirurg. Soc. of London, vol. iv. p. 48. — *Wardrop*, in ibid. vol. xii. p. 205. — *C. Bell*, Exposit. of the Natural Order of the Nerves of the Hum. Body. 8vo. Lond. 1824; and The Nervous System of the Hum. Body, as explained in Papers read before the Roy. Soc. of London; with Cases, &c. 8vo. Edin. 1836. — *Breschet*, art. *Cicatrice*, in Dict. des Sciences Méd. t. v. — *Mayer*, in *Reil's* Archiv. f. d. Physiol. b. ii. p. 449. — *Jobert*, Etudes sur le Système Nerveux, p. 547—634. 8vo. Paris, 1838.— *Prevost*, Annal. des Sc. Natur. 1827. — *P. Flourens*, in ibid. 1823. t. xiii. p. 113.; et Journ. des Progrès des Sc. Méd. t. xii. p. 268. — *Pigné*, in Journ. Hebdom. de Méd. &c. Ann. 1832. t. vi. p. 309. — *Horteloup*, in Journ. des Connaiss. Méd. Chirurg. Jan. 1835. p. 144 —*Descot*, Opus Cit. p. 98. — *Jeffreys*, Archives Génér. de Méd. t. ii. p. 293. Paris, 1823. — *Galenzowski*, in ibid. t. xxiii. p. 26. —*F. Tiedemann*, in Journ. Complem. des Sc. Méd. t. xli. p. 289.

iii. *Atrophy and Hypertrophy of Nerves.* — *Vesalius*, De Corporis Humani Fabrica, l. iv. c. 4. — *Morgagni*, Epist. ii. 36. xiii. 9, 10. lxiii. 6. — *Lieutaud*, Hist. Anat. Méd. l. iii. obs. 188—191. — *Wenzel*, De Penitiori Cerebri Structura, p. 116—126. — *Haighton*, in Mem. of Med. Soc. of Lond. vol. iii. p. 1. — *Rudolphi*, Grundriss der Physiolog. b. ii. p. i. p. 220. — *Otto*, De Morbis ab Intumescentia et Pressione Nervor. per Foramina Ossium egred. &c. Erf. 1799; et Anat. Patholog, p. 445. — *Biermayer*, Museum. Anat. Pathol. Vind. p. 134. 1816. — *J. F. Meckel*, Archiv. f. d. Physiol. b. iii. p. 196. —*Jeffrays*, in Lond. Med. Repos. ed. by *J. Copland*, April, 1822. — *Ward*, in ibid. Sept. 1823. — *Itard*, Traité des Maladies de l'Oreille, 8vo. Paris, 1821. — *Koreff*, in *Magendie's* Journ. de Physiol. t. iv. p. 374. — *Béclard*, in ibid. t. v. p. 17. — *Serres*, in ibid. t. v. p. 233. — *Esquirol*, in Dict. des Sciences Méd. t. viii. p. 291. — *Romberg*, Zeitschrift fur die Anthropologie, 1823, P. iii. p. 224. — *Bellingieri*, in Annali Universali de Med. Mar. 1827.— *Pinel*, Nouv. Journ. de Méd. t. iv. p. 40.

iv. *Neuromata, or Tumours of Nerves.*—*Sandifort*, Mus. Anat. vol. iii. p. 148. — *A. Portal*, Cours d'Anatom. Méd. t. iv. p. 247. — *Spangenburg*, in *Horn's* Archiv. f. Med. Erfahrung. b. v. p. 306. — *Odier*, Manuel de Méd. Prat. 8vo. p. 278. Geneve. 1803. — *E. Home*, Op. Cit. vol. ii. p. 192. — *Alexander*, De Tumoribus Nervorum. 4to. Lugd. Bat. 1810. — *Neumann*, in *Von Siebold's* Samml. Chirurg. Brobachtungen, b. i. p. 54. — *Adelmann*, in ibid. b. iii. p. 177. — *Mojon* et *Coverceli*, in ibid. b. i. iii. — *Pring*, Op. Cit. p. 151.— *Descot*, Op. Cit. p. 257. — *Otto*, Selt. Beobachtungen, &c. p. i. p. 83. — *Aronssohn*, Sur les Tumeurs developpées dans les Nerfs, 4to. Strasb. 1822. — *Wishart*, in Edin. Med. and Surg. Journ. July, 1822. — *W. Wood*, On Painful Sub-cutaneous Tubercle, in ibid. vol. viii. p. 283. 429.; and in Trans of Med. and Chirurg. Society of Edin. vol. iii. p. 317.; and in Neuroma, in ibid. vol. iii. p. 367. — *Ollivier*, Traité de la Moëlle Epinière, t. i. p. 492. 3d edit.; and in Dict de Méd. art. *Nerfs*. — *J. Frank*, Praxeos Med. Univers. Præcepta, vol. iii. p. ii. — *Abercrombie*, On Diseases of the Brain, &c p. 414. — *Cruveilhier*, Anat. Pathologique, livr. i. pl. 3. — (See also numerous other references of less importance in Ploucquet's Medicina Digesta, and in Otto's Anat. Pathol.)

NEURALGIC AFFECTIONS.— Syn. *Neuralgia* (from νεῦρον, a nerve, and ἀλγέω, I suffer pain). *Neuralgia faciei*, *Prosopalpia*, Swediaur. *Hemicrania idiopathica*; *Trismus maxillaris*, Auct. *Trismus dolorificus*, Sauvages. *Rheumatismus spurius nervosus*, Most. *Autalgia dolorosa*, Young. *Dolor Faciei crucians*, Fothergill. *Dolor Faciei Fothergillii*, Auct. Var. *Neuralgia*, Chaussier, Good, and others. *Neuralgie*, *Tic Douloureux*, Fr. *Nervenschmerz*, *Nervöses Reissen*, *Antlizschmerz*, *Gesichtsschmerz*, Germ. *Neuralgia*, Ital. *Excruciating nervous pain.*

Classif. — IV. Class. II. Order (*Good*). — II. Class. III. Order (*Author*).

1. Defin. — *Violent pain seated in the trunk or branch of a nerve, occurring in paroxysms of irregular duration, and after either irregular or regular intervals.*

2. Neuralgic affections were confounded by the ancient and older writers with tooth-ach, rheumatism, gout, &c., according to the seat of suffering. Cotugno, Fothergill, André, Pujol, Fortsmann, and Chaussier, were amongst the first who directed attention to these affections with precision, and distinguished them from the disorders with which they had been formerly confounded. Since the commencement of the present century several writers in this country and on the continent of Europe (see Bibliog. and Refer.) have advanced still further our knowledge of this subject. At first the study of neuralgia was confined to the occurrence of it in the nerves of the face and lower extremities, and the terms neuralgia and tic douloureux were applied only to the most excruciating states of pain experienced in these parts; but more recently these terms, or a qualitative one, implying very close resemblance, as neuralgic affection, &c., have been extended to all morbid exaltations of sensibility in parts not manifestly inflamed; so that they have been made to comprise, by French pathologists in particular, disorders formerly very differently named, and seated in internal viscera.

3. That morbid exaltations of sensibility, independent of inflammation, in a recognisable form, occasionally affect internal organs, cannot be doubted, and that they are quite as often seated in the ramifications of the organic or ganglial nerves, as in the cerebro-spinal nerves, is equally evident to the close observer, although their characters may vary with the difference of seat; and that they actually do thus vary in character is well known. The pain experienced during a paroxysm of neuralgia in one of the branches of the fifth pair of nerves, however excruciating, is not attended by that intolerable feeling approaching almost to vital extinction, which characterises those pains in internal or vital organs, that have been more recently termed neuralgic, that formerly had different names imposed on them, but that, however named or described, undoubtedly belong to the category of *neuralgic affections*. Therefore I shall comprise under this head, as succinctly as may be compatible with a due discussion of the subject, all those very painful disorders, wherever seated, which are apparently unconnected with inflammation, and which are not the result of some important or recognisable lesion.

4. According to this view, as well as to the mode of considering the subject, adopted by some

recent writers, several disorders, particularly toothach, headach, the different forms of colic, certain manifestations of hysteria, &c., might with propriety be considered as forms of visceral neuralgia; but these disorders, as well as some others, which have actually been thus viewed by a few of these writers, are generally so intimately connected with some more tangible or recognisable mischief, and so dependent upon it, that the propriety of retaining the old appellations, whilst we acknowledge the pathological relation they have insisted on, remains unaffected by the more partial view entertained by them. In naming and arranging, as well as in discussing, these and other disorders, prominent phenomena should not alone be noted, to the neglect of other important, although more latent morbid relations, but all sides of the subject ought to be duly viewed.

5. I. General Characters of Neuralgia. — The pain of neuralgic affections sometimes is slight and obtuse at its commencement, and augments in violence with more or less rapidity, becoming sharp, lacerating, darting or lancinating and being attended by excessively acute, constrictive, or plunging sensations, which at short intervals dart through the pained part — the *fulgura doloris* of Cotugno. More frequently the pain is sudden in its accession, and it is occasionally preceded by an itching or heat in the part, or by numbness and pricking sensations, or by slight and fugitive pains, either or most of which may recur during the remissions between the more violent paroxysms. In some cases, the attack of neuralgia is preceded by nausea and general disorder, with more or less of derangement of the digestive and biliary organs; and in others, by anxiety at the præcordia, by slight dyspnœa, or by slight chills followed by heat. At the commencement the pain is attended by numbness or torpor and formication; and it is commonly lancinating or darting, although sometimes pulsative, or acutely smarting or burning. Whatever character the pain may assume, it is often instantaneous in its occurrence and disappearance — resembling a shock of electricity. It is frequently confined to the trunk of the nerve, but as often it extends itself to the ramifications, and even to the terminations of the nerve. More rarely it extends from the ramifications to the trunk. Sometimes it affects only a few of the branches, or even one or two merely of the fibriles. Accompanying the pain, especially during its greatest intensity, other phenomena are observable: tremors, spasms, cramps, or convulsive motions of the muscles connected with the affected nerves; general exaltation of sensibility, with restlessness and agitation; sometimes a tetanic rigidity of the muscles; and more rarely an inability of contracting them, with loss of sensibility towards the surface. Generally, neither redness, heat, nor swelling of the part can be detected. Occasionally, however, the arteries in the vicinity pulsate more strongly, and the veins are somewhat distended. M. Ollivier states that he has observed, in a few instances, where the nerve was superficial, that its volume was somewhat increased. These were doubtless cases of *neuritis*, which has very generally been confounded with *neuralgia*, and to which the latter is probably more frequently owing than is generally supposed, or than can well be demonstrated; for neither swelling, heat, nor redness attends neuralgia, but they all accompany and indicate neuritis; still they are so limited in extent and amount, when inflammation is confined to a nerve, as hardly to admit of appreciation or detection during an examination of the surface of the part affected.

6. The *duration* and *return* of the paroxysms are extremely variable. Sometimes the affection is intermittent, at other times only remittent; the attacks occurring after irregular, and much more rarely after regular, intervals. Some authors have supposed, from this latter circumstance, and certain of them, even although the intervals may be of irregular or prolonged duration, that the disease is a local or masked ague, originating in such cases in malaria. Often when the paroxysms become more frequent, they become also more violent, and sometimes of longer duration. When the attack is very sudden it frequently continues without abatement for an indefinite, but generally short period, and then as suddenly ceases. The most intense attacks are often of the shortest duration, but generally they vary from two or three minutes to several hours. When they continue much longer, the intensity of the pain varies, and slight remissions, with acute, lancinating, constrictive or lacerating pangs dart through the part like shocks of electricity, occasioning irregular spasms or twitchings of the muscles, and intense suffering. A critical evacuation, as hæmorrhages, particularly epistaxis, menorrhagia, hæmorrhoidal discharges, salivation, cutaneous eruptions, an abundant general or local sweat, or a copious discharge of the lochia or of urine, bilious or mucous diarrhœa, the formation of an abscess, discharges from the ear or from its vicinity, or a regular attack of gout or rheumatism, or prolonged exertion, attended by a copious and sustained perspiration, sometimes are observed, and serve to account for the sudden or even for the more gradual cessation of suffering.

7. The accessions of the attack often cannot be attributed to any appreciable cause; but more frequently they are occasioned by overloading the stomach; by neglect of the biliary functions, and of the states of the bowels; by excesses in the use of intoxicating liquors; by exposure to cold, damp, humidity, or malaria; by injurious over-exertion, &c.; or by any of the remote causes of the complaint acting even slightly or inappreciably.

8. In comparatively few cases is the health quite restored at the end of the paroxysms, or during the interval; for more or less disorder of the digestive or biliary organs may be detected in the great majority of them, with impaired tone of the organic nervous system, and general lassitude or debility, although the patient may seem quite well in the intervals, and be able, with few interruptions, to pursue his usual avocations. In many, more or less uneasiness, numbness, prickings, soreness, smartings, or sudden but momentary pangs, are felt at times in the part between the more severe paroxysms; and in some the general health, or the digestive organs, betray more or less marked disorder.

9. As to the *duration of the disease*, it is impossible to state any thing with precision. A person who has once suffered an attack is liable to a return of it, although he may have been completely restored; and a return or returns of it may take place in a short time, or not till after

many months or even years. As respects the paroxysms, it is an *acute* malady; but as regards the repetition of them, the liability to their return, or even their actual recurrence, it is generally a *chronic* and most prolonged disease.

10. II. Special Notices of Neuralgia. — Neuralgia may affect the nerves of the head, trunk or extremities, particularly those which are seated superficially, or are most exposed, and surrounded by loose cellular tissue; it may affect also the visceral nerves, as the nerves of the heart, of the diaphragm, of the liver, spleen, stomach, bowels, uterus, kidneys, &c., giving rise to those affections which have been usually named *angina pectoris, syncope anginosa, gastralgia, gastrodynia, colic, ileus, hepatalgia, nephralgia,* certain states of *hysteria,* of *hypochondriasis,* &c., all which are noticed either under their specific appellations, or under the viscera in which they appear to be chiefly seated. Of all the *special forms* or *seats of neuralgia,* those affecting the *face* and *head* are the most severe, frequent, and important.

11. i. Facial Neuralgia.—*Neuralgia Faciei.* —*Tic Douloureux.*—It is more easy to say what this affection is not, than what it is. It is not, as M. Berard has remarked, acute neuritis, nor chronic inflammation, nor any structural change, of the nerve; and, although various lesions have been detected in connection with this affection, these have rarely been observed in the nerve itself, and are neither so constant in occurrence, nor so uniform in character, as to account for it. The pathological and symptomatic phenomena of the complaint can only be stated in connection with the morbid exaltation of sensibility which constitutes it; and this lesion of sensibility cannot be otherwise defined, than as *a pain varying in its character, always excessive, generally intermittent, returning sometimes at regular intervals, but more frequently after irregular periods; seated in one of the branches of nerves of the face, and extending in various directions through certain of their ramifications; existing without evidence of inflammation or of fever; and, although occasionally connected with organic changes in some part related to the affected nerve, yet as often occurring without such morbid relations, or without any obvious connection with them in some cases where they are found to exist.*

12. *a.* Although *tic douloureux* was not described by the ancients as a distinct affection, it was certainly known to them, but confounded with various forms of headache; and as such it was described by Aretæus (see *De Caus. et Sig. Diuturn.* l. i. cap. 2.). It was first described as a distinct affection, and the name "*tic douloureux*" given to it, by M. André, of Versailles. Very soon afterwards Dr. Fothergill published an account of it in the *Medical Observations and Inquiries.* Since then it has received the various appellations above stated as synonymes of neuralgia in the generic acceptation of the word. That Tic is an affection of a nerve, numerous considerations and proofs sufficiently demonstrate; and that it is seated in some one or more of the ramifications of the *trifacial* or fifth pair, is also proved by the seat, direction, and phenomena of the affection. The researches of Sir C. Bell, Shaw, Magendie, Mayo, &c., have shown this nerve to be chiefly, if not entirely, a nerve of sensation; and the ramification of its principal branches from a large ganglion, the Casserian, further proves this to be its chief function, and demonstrates its relations to the ganglionic system. That a morbid exaltation of sensibility should, therefore, more frequently occur in the more superficial ramifications of a nerve whose office it is to transmit sensations from the face to the brain, these ramifications being the most exposed of any to vicissitudes of temperature, weather, &c. than in any other nerve, may be readily admitted, and explained by this circumstance. The experiments of Professor Riberi on the frontal branch of this nerve, further illustrate this fact, and prove that the facial or seventh pair of nerves is not the seat of this affection. Not only is this shown by the seat of the pain, but by the experiments of the physiologists just mentioned, and by those made by Fodera, Burdach, Schœpf, Bucker, and Eschricht.

13. Admitting, therefore, that the ramifications of the trifacial nerve are generally the seats of tic, or neuralgia of the face, the question may still be asked, are the branches of the facial or seventh pair ever similarly affected? The free inosculations of the branches of the one nerve with those of the other, and the consequent extension and direction of suffering, render it very difficult to prove an affection of the latter nerve. Still, although pure tic may never be seated in the facial or seventh pair of nerves, inflammation, or any powerful source of irritation, may excite a most intense pain in the trunk and principal branches of this nerve closely resembling tic, although more closely allied to the more diffused neuralgic pains occasionally affecting other situations. Halliday and Chaponniere have adduced cases which they believed to be neuralgia of the seventh pair: and within a few months of the period in which this was written, I attended a patient suffering neuralgia of this nerve, the pain extending to the whole side of the face, and to the neck and occiput. The affection was evidently seated in this nerve, but was considered as inflammatory, and treated by local depletions and blisters to the nape of the neck, which permanently removed it. M. Berard has seen neuralgia of the second cervical nerve. I have been, during the last few years, consulted respecting three remarkable cases of neuralgia of the nerves of one side of the head, extending from the occiput to the forehead and vertex: one was sent to me from *Mons,* and another from *St. Omer.* It was difficult to determine in these cases which of the nerves supplying this part was the seat of the disease; but the facial, and branches of the first and second cervical were considered as chiefly implicated. In these, the attacks continued on each occasion from two or three to several hours, with the most agonising exacerbations, and were ushered in, in one case with vomiting, by horripilations, and a free discharge of pale urine. In another case, the attacks frequently commenced in the night or early in the morning, and were kept off during many months by the treatment about to be recommended.

14. *b. The Symptoms* of Tic are chiefly the intensity and paroxysmal nature of the pain constituting it. The pain occurs, or is exacerbated, in fits; the succession of a various number of fits constitutes an *attack,* which may be of uncer-

tain duration, and leave the patient comparatively well in the intervals, which also are of uncertain continuance. The accession of the fits is generally sudden, but is often preceded by various indications of its approach, as itching of the nose, sneezing, tickling, pricking or coldness, creepings or formication, &c. in the part about to be affected. In some cases it is preceded or attended by an abundant discharge of urine, by horripilations or pandiculations, especially when the complaint assumes a regular or periodic character. After these precursors, or independently of them, the pain darts through one or more ramifications of nerves, and either instantly, like a shock of electricity, or very rapidly, acquires its utmost intensity. The pain is most acute, burning, tensitive, pungent, stabbing, lacerating, &c. (§ 5.), and so poignant as to excite the agonising cries of the patient. The pain has been so intolerable as to cause the patient to terminate his existence (Duval). The suffering is generally referred to one of the branches of the trifacial nerve, and darts along the minute ramifications, but it is not always so limited to a branch or fibrile as to admit of its precise seat or source being indicated. It sometimes radiates in several directions, and seldom is concentrated in one point without extending in the direction of the smaller branches. In the great majority of instances, tic douloureux is limited to one or other of the three branches of the fifth pair of nerves, but it occurs probably more frequently in either the ophthalmic or the superior maxillary branch than in the inferior maxillary. When it is seated in the first or ophthalmic branch, the frontal ramification of it is oftener affected than the lachrymal or nasal; but in rare cases it extends to two or all of these ramifications in the same case; and often when the frontal nerve is affected, an abundant secretion of tears takes place, or pain is felt in the eye, and sometimes uneasy sensations are experienced in the side of the nose, with dryness, itching, &c.

15. When the *second* or superior maxillary branch of the trifacial is the seat of suffering, the infra-orbital is the part most commonly affected, although the pain may extend more or less to the other ramifications of the maxillary. Generally the pain is referred to the infra-orbital nerve as it passes from the foramen, or proceeds from it to be expressed upon the upper lip, ala of the nose and gum. It sometimes affects the posterior dental ramification, and resembles a severe attack of tooth-ache. It more rarely is seated in the extreme branches supplying the pillars of the fauces and adjoining parts, in which, however, I have observed one instance.

16. Tic douloureux of the *third* branch is generally seated in the inferior dental nerve, and particularly its mental portion as it emerges from the mental foramen, extending to the inferior lip. In some instances the pain affects the branch which the inferior maxillary branch sends to the seventh pair; and when this is the case the affection appears to implicate the latter nerve. In others, the tic is seated in the anterior auricular branch, the pain extending to the temple in the course of the temporal artery. In very rare instances it is seated in the lingual branch of the inferior maxillary. Of this variety I have met with one case, in a female about fifty years of age.

17. *c.* Neuralgia faciei may thus be divided into *frontal*, *infra-orbital*, and *mental*, according to its common seat, the other ramifications of the three principal branches of the fifth pair being much more rarely affected. Whatever variations the complaint may present, the pain rarely or never passes from one side of the face to the other; and as seldom has it been observed to exist in both sides at the same time: of this latter occurrence however, Frank, in his extensive experience, met with two instances. During the neuralgic paroxysm, the muscles of the face are often contracted, so as to give the countenance most singular expressions; but the muscles of the unaffected side are rarely or never similarly affected. The least motion or noise occasionally aggravates the pain, and when the ophthalmic branch is the seat of the complaint, a strong light has generally the same effect. On examining the seat of suffering, little or no alteration can be detected, beyond a slight blush occasionally of the surface, or a little redness of the conjunctiva, when the first branch is affected, and a somewhat stronger or fuller pulsation of the arteries going to the affected parts; but there is no febrile commotion of the system, nor acceleration of pulse, which often beats slower than usual during the fit.

18. *d.* The duration of the fit varies from less than a minute to one, two, or several minutes, or to a quarter or half an hour, or even longer. The severer the complaint becomes, the longer are the attacks. The termination of the fits are often as sudden as the commencement, and sometimes more so; and in some cases, particularly of frontal neuralgia, a copious discharge of tears or of mucus from the nostril attends it, and seems to be critical; but occasionally the fit subsides more gradually. Some cases of tic are irregular, or *atypetic*, in respect of the intervals between the paroxysms, whilst others are periodic, and resemble a masked intermittent. The most trivial circumstance, or the slightest vicissitudes of temperature, a moral emotion, or exposure to the air, &c., will often suffice to bring on a fit. According to Frank, the attack takes place more frequently during the day than night.

19. *e.* The whole *duration* of the complaint may be very long. It may cease for months or even years, and return in a more severe form than before, generally in the same branch of the trifacial as before, but sometimes in another branch of this nerve. In some instances the fits become more frequent with the duration of the complaint. An increased severity or frequency of the attacks is generally followed by a failure of the general health, and by more or less emaciation, owing to want of sleep, anxiety, and dread of the recurrence of the fits, and impairment of the digestive, assimilating, and excreting functions.

20. ii. Toothach. —*Odontalgia.* — *Dolor Dentium.*— *Odontalgie, Douleur de Dent*, Fr. — *Der Zahnschmerz*, Germ.—*Odontalgia, Dolor di Denti*, Ital.—Toothach is undoubtedly a variety of neuralgia, although it may be more frequently referred, than any other variety of the complaint, to some source of irritation in one or more teeth, or in the gums or antrum. Yet, even without these obvious causes, and often when they very prominently exist, an attack of toothach is often brought on by the same causes as those which produce the other forms of neuralgia (§§ 52. *et seq.*).

the local sources of irritation being often insufficient to develope this morbid effect, until aided by other agents or influences.

21. *Odontalgia* may be divided into — 1st, The *inflammatory*, or that caused by inflammation of one or more of the constituent structures or tissues of the teeth; 2d. The *ulcerative or carious*, or that caused by ulceration or caries of a tooth, and consequent exposure or irritation of a nervous fibrile; — 3d, The *nervous*, or neuralgia of the nerves supplying the teeth and gums, independently of inflammation or caries of a tooth — *neuralgia dentalis*. Besides these varieties, toothach may proceed from inflammation or abscess of the gum or in the antrum, from caries of a portion of the alveolar processes or of the upper or lower jaw, from fungus, exostosis, or other growths, on the root of a tooth, from retention of one of the first set, and from a wrong direction being given to one or more of the second set. It may affect, moreover, the *gouty* or *rheumatic diathesis*, and thereby assume a modified or more extended form; and it may be developed by exposure to cold, malaria, &c., and be characterised accordingly.

22. There can be no doubt that, even when the most energetic of these sources of irritation are present, little or no pain or uneasiness is sometimes felt, until disorder of the digestive organs occurs — until the functions of the stomach, duodenum, or intestines are deranged, either by improper ingesta, or by morbid secretions poured into or accumulated in them; or until bile collects to an injurious amount in the gall-bladder and ducts, and depresses the organic nervous influence. When, however, these disorders of the digestive organs occur, the affection of the dental nerves is developed, particularly in those parts more immediately irritated; and as soon as those disorders are removed, or morbid matters evacuated, the pain subsides, even although the local source of irritation remains; still, as long as it remains, toothach recurs whenever local or constitutional causes of neuralgia occur to develope its effects.

23. The attacks of toothach vary much in character and intensity, according to the nature of the local mischief, to the states of the digestive organs, and the temperament and diathesis of the patient. In some the paroxysm is most acute and intense, but of short duration; in others it is much less severe, but continues a much longer and a very indefinite time, it being of an aching kind with occasional exacerbations. In many, the pain, whether most acute or more chronic, is limited to the seat of local mischief, or even to the tooth itself; in others the pain extends to the whole jaw, or to the cheek, or even to the whole side of the face, particularly when the upper jaw is the seat of irritation, and after exposure to a current of air or to cold. In those states of the complaint which have, by some writers, been called *catarrhal*, *rheumatic*, and *gouty*, the pain often extends to a great part of the same side of the face, and it is often difficult to localise it, with much precision.

24. iii. NEURALGIA OF THE NECK AND TRUNK. — *A.* M. ITARD has described, under the name of *Otalgia*, a neuralgia of the ear, seated chiefly, as he supposes, in the *chorda tympani* and acoustic nerve. It is sometimes associated with neuralgia of the face. The pain in the ear is very acute, is sudden in its accession and disappearance, and is independent of any indication of inflammation of the ear. It is often attended by noises in the ear, and by temporary deafness (*see art.* EAR, § 6.).

25. *B. Neuralgia of the cervical Nerves* is very rare. M. BOSQUILLON met with a case which was apparently caused by the puncture of a nerve in bleeding from the jugular vein; and M. JOLLY has alluded to another which appeared to be produced by the application of leeches to the side of the neck. A less severe or *chronic form* of neuralgia of certain of these nerves, resembling rheumatism in many respects, but attended by spasm or contractions, more or less permanent, of some of the muscles, sometimes occurs in connection with caries or other disease of, or in the vicinity of, the upper cervical vertebræ. Of this state of the complaint I have seen two or three cases, but in neither was the pain so intolerable as in the most acute cases of neuralgia.

26. *C. Neuralgia of the thoracic or intercostal Nerves*, and painful affections of the other nerves of the trunk, have been described by SIEBOLD, NICOD, JOLLY, ALLNATT, VALLEIX, TEALE, and BROWN, as *Neuralgic;* by PARRISH, DARWALL, GRIFFIN, OLLIVIER, and BENNETT, as resulting from *spinal irritation;* and by TATE, ADDISON, and others in connection with *hysteria*, and *uterine irritation*. That these painful affections, whether amounting to neuralgic acuteness, or hardly exceeding a rheumatic aching, may depend, in some instances, upon vascular congestion of a portion of the spinal cord, or of its investing membranes, or upon inflammatory irritation, or some other morbid state of the circulation in these parts is very probable, although the exact state of these structures has not been satisfactorily demonstrated in connection with these affections. Still cases not infrequently occur of neuralgic or painful states of the thoracic and abdominal nerves, without any evidence of congestion or irritation of the spinal cord; whilst, on the other hand, proofs of these states of spinal disorder are often furnished to the close observer, without any painful expression of it in those particular nerves. When treating of the painful manifestations of HYSTERIA (*see that art.* §§ 14, *et seq.*), I had occasion to remark, that disease of the spinal cord or of its membranes is not necessary to the production of these painful affections; and that when such disease is observed in connection with them, it is to be viewed rather as a contingent result of the same irritation as produced them, or as an associated complaint, rather than as the primary and necessary source of these affections (HYSTERIA, §§ 23. 61.). A similar view may be entertained respecting the connection of neuralgia of the nerves of the trunk with spinal irritation, in cases where no evidence of hysteria exists.

27. That neuralgia of these nerves is often connected with hysteria, as often with evidences of disorder, congestion, &c. in a corresponding portion of the spine, and often also without one or other of these, and even without both, I believe to be nearly the truth. The much greater frequency of the affection in females tends to prove the first of these positions. Thoracic neuralgia commonly occurs about the union of the seventh, eighth, and ninth ribs, with their cartilages, and chiefly on the left side. The pain often extends from this point, in the course of the nerve to the spine, and sometimes it associates itself with a similar

pain in the mamma of the same side. It generally darts in the course of the nerve; and, although it has little influence on the state of the organic functions, it sometimes embarrasses the respiration. It is occasionally associated with pain in the epigastrium or in the bowels, or with hysterical colic, or with pain in the region of the uterus or ovaria. These neuralgic pains may be distinguished from rheumatism by the latter being accompanied with soreness of the muscles on pressure, and on contracting them; whilst the former are attended by extreme sensibility of the skin and parts supplied by the affected nerve. These pains sometimes occur coëtaneously on both sides of the chest, rarely successively, and often they are periodic. They are frequently independent of any evidence of disorder in the spinal cord or its coverings.

28. Intercostal neuralgia is a frequent complaint. The greater number of cases usually denominated *pleurodynia*, ought to be classed under this head. It chiefly affects females: of 148 cases noticed by Messrs. GRIFFIN, 26 were males, 49 married women, and 73 girls. It is most frequently observed between the ages of 15 and 50 years; and occurs in all temperaments, particularly in the nervous and sanguineo-nervous. Residence in low, damp cellars and localities, or in close ill-ventilated apartments; laborious vocations, and poor diet; watchings and night work; are amongst its most influential causes. It is sometimes associated with other neuralgic affections, or with suppression or irregularity of the catamenia.

29. This affection occurs much more frequently in the left than the right side. According to the researches of M. VALLEIX, of all the intercostal spaces, the sixth, seventh, eighth, and ninth are its common seats. He has never observed it in the eleventh and twelfth spaces, and very rarely in the first and tenth. The pain is generally much increased on pressure; but not in all parts of the course of the nerve. There are usually very limited points where the pain is felt acutely; and these are separated by intervals, where pressure is not painful. These points are situated, 1st. A little from the spinous processes, and corresponding to the point where the nerve passes from between the vertebræ. 2d. At the anterior part of the intercostal space, and near to the sternum or epigastrium; and 3d. About the middle of the intercostal space; where, however, the pain is much less frequent than at either extremity. At these points, the pain is often so acute as to occasion the most marked indication of extreme suffering when the finger is passed over them; and it is generally increased on a full inspiration, by cough, and sometimes even by the movements of the arm or side; but it presents this peculiarity, that inspiration excites pain in one point, and other emotions in a different point.

30. The pain may be either dull, aching, sore and continued, and felt chiefly in one or other of the points just specified: or it may be sharp, darting, poignant, and recurring at intervals of short, but of various duration. Generally both kinds of pain are felt, the latter being superadded to the former. The acute lancinating pains commonly proceed from either of the points which are painful on pressure, and dart in the course of the nerve. In connection with this pain, there is no indication, upon auscultation or percussion, of inflammation of either the lungs, pleura, or pericardium; and there are also febrile symptoms. The digestive organs are, however, commonly more or less disordered, this disorder manifestly depending upon the same pathological state as gives rise to the neuralgia, viz. impaired energy and irritation of some portion of the organic nerves.

31. The course of this affection is often irregular. The pain usually increases gradually, and subsides in the same way; but it is much influenced by the states and vicissitudes of season, weather, and temperature. It is commonly most severe in cold or snowy weather. In many the affection assumes a regularly intermittent form, and it is then of long duration.

32. *d. Neuralgia of the lumbar Nerves* has been mentioned by several writers, but true neuralgia is rarely observed in this situation. Most of the cases which have been thus termed have evidently been instances of severe pain, symptomatic of irritation in the kidneys, ureters or urinary bladder, or in the uterine organs. MM. CHAUSSIER, RICHERAND and DELPECH, have described cases of neuralgia, which they have referred to the anterior branch of the first lumbar nerve, and in which the pain has extended from the loins and crest of the ilium to the groin and labia of the vulvæ of the female, and to the chord and scrotum or testicle. The pain was very acute, and recurred daily, with retraction of the testicle, but without any disorder of the urinary excretion. Somewhat similar cases have been noticed by MM. BARRAS and CAMPAIGNAC; but in these the pain, affecting chiefly females, was experienced near the neck of the bladder and vulva, and was unattended by any disorder of the urinary functions. SIR ASTLEY COOPER has adduced some cases, in his work on the Testis (p. 110.), which he believed "to be seated in the nerves and to be of the nature of tic douloureux." In these, the pain darted in the direction of the spermatic chord; and one of them seemed to have been caused by an injury received some time previously on this part. Sir ASTLEY states that the affected testis hung lower than the unaffected, and he adds that he dissected all the testicles which he had removed for this complaint, but there was no apparent structural change in any of them.

33. Certain states of *lumbago* are more nearly allied to neuralgia than to rheumatism, in respect not only of the characters of the pain and of the accompanying, but also of the aggravating and alleviating circumstances and agents. Even in those cases, where the pain is evidently seated in the lumbar muscles, it is nevertheless to be referred to some change in the circulation in that portion of the spinal chord, or in the roots of the nerves supplying these muscles. (*See arts.* RHEUMATISM, and SPINAL CHORD.)

34. iv. NEURALGIA OF THE EXTREMITIES. — *Neuralgia Membrorum.* — *Neuralgie des Membres,* Fr. — Neuralgia is comparatively rare in the upper, but not infrequent in the lower extremities. — *A. In the former situation,* cubito-digital neuralgia, as it has been termed by CHAUSSIER, or neuralgia of the cubital nerve, is oftenest met with. It is generally seated in that portion of the nerve which passes between the internal tuberosity of the humerus and the olecranon, from which it

darts in the course of the nerve. Sometimes it appears below the armpit, following the inner margin of the fore-arm, and extending to the cutaneous branches of this nerve, and to those sent to the little and ring-finger. In recent attacks the temperature of the arm is occasionally increased during the paroxysm, which frequently occurs during the night. In very severe fits the patient experiences much anxiety, often holds the arm up, and grasps it forcibly with the other hand. Besides neuralgia of this nerve, M. MARTINET has mentioned neuralgia of the *supra-scapular* and *external musculo-cutaneous nerves*. In both these the pain is seated in, and extends more or less to, the ramifications of the nerve. In these three different seats of suffering the complaint presents similar phenomena.

35. *B.* SCIATIC NEURALGIA.—*Neuralgia Sciatica.* — *N. fémoro-poplitée,* Chaussier; — *Sciatica,* Auct. Var.; — *Ischias nervosa postica,* Cotugno; — *Ischias, Sciatica, dolor ischiaticus, Ischiagra, Malum ischiadicum, &c.* — This form of neuralgia was formerly confounded with all painful affections of the hip and adjoining parts,—whether inflammatory or rheumatic — primary or symptomatic; and the pain was referred to the joint, to the muscles, to the bones, to the tendons, to the nerves, &c., according to the views of the writers. Hence amongst the *synonymes* of the complaint we find *Morbus Coxendicus, Morbus Coxarius, Dolor Coxæ, Coxagra, &c.*, names which belong to different affections. Sciatica has also been viewed as a variety of rheumatism, until the comparatively recent writings of CHAUSSIER and others have shown that, although often very closely allied to certain states of that disease, it is essentially a form of neuralgia. It is a common disease in advanced age; it is very rare in infancy and childhood; and it is somewhat more frequent in females than in males, particularly in females during the puerperal states. It attacks in preference the nervous temperament, and the rheumatic and gouty diathesis. It is most frequent in cold and wet seasons, during stormy and changeable weather, and in low, humid, clayey, and marshy localities. It is common among fishermen, sailors, soldiers, and all those who are liable to wear wet clothes, or who are exposed to currents of damp air or to cold. Owing to the state of weather, season, locality, and occupation, I have observed it assume an almost epidemic frequency.

36. An attack of sciatica generally commences with acute pain in the sciatic slope or curve between the great trochanter and the ischium; and the pain follows the course of the great sciatic, or femoro-popliteal nerve, extending sometimes upwards to the sacrum, but generally downwards along the posterior surface of the thigh to the popliteal space, and often along the nerves of the leg to the foot. It is sometimes very severe in the tibial nerve. The accession of pain is occasionally sudden, but it is often preceded by painful pricking or tingling along the thigh, by slight numbness, or by chills, formication, &c. Usually one limb only is affected, and very rarely both. The motions of the extremity are extremely painful and difficult. During the exacerbations some patients suffer most in the sciatic slope, others in the posterior part of the thigh, and others in one or both the popliteal or tibial nerves. The pain is in every respect similar to that felt in other kinds of neuralgia. Exacerbations of it occur generally in the evening or during the night, and cease in the morning; but several may take place during the day, with remissions more or less complete, during which the pain is more dull, and is attended by numbness and pricking or tingling. The slightest cause may bring on the exacerbations, as motion or exertion, the heat of bed, or mental excitement. The duration of the *exacerbations* of pain, as well as the frequency of their recurrence, is very various, and differs but little from other forms of neuralgia. The continuance of the *attack* is equally uncertain; the causes of the complaint, the constitution of the patient, and various other circumstances, influencing it. In some cases, the accessions of suffering are followed by convulsive or trembling movements of the limb, by slight numbness, or partial palsy: and an attack generally leaves the limb emaciated, flabby, and weakened. When the attack has been very severe, or of long continuance, lameness, a dragging of the leg; great emaciation of the limb; a weakened or partially paralysed state of the muscles; and disorder of the digestive organs, are experienced for some time afterwards.

37. *C.* FEMORAL OR CRURAL NEURALGIA — *Neuralgia Cruralis* — *Ischias nervosa antica,* COTUGNO — *Neuralgie fémoro-pretibial,* CHAUSSIER — occurs much less frequently than sciatic neuralgia. It may affect any portion of this nerve from the groin downwards. It often commences in, or a little below, the groin, and extends along the anterior and internal aspect of the thigh and leg to the foot, and even to the sole. In a case of neuralgia seated in this nerve, in a gentleman from South America, at present under my care, the pain is experienced chiefly in the middle of the thigh and of the leg, and *in both extremities.* The pulse is somewhat frequent and irritable, and the bowels disposed to be costive. The muscles are soft and flabby, and the spirits depressed. The complaint has been of long duration, and the intermissions few and of short duration, since his arrival in England.

38. v. NEURALGIA OF MUSCULAR AND MEMBRANOUS STRUCTURES has been noticed by several modern writers; and, adhering to the definition of neuralgia (§ 1.), and to the circumstance of the occurrence of severe pain in these structures independently of fever, it may be viewed as often allied to neuralgia, although passing, in its characters and in its various morbid associations, in some cases into chronic rheumatism or gout, and in others into hysteria.—*a.* But in *true neuralgia of the muscles* the pain is much more acute than in rheumatism, recurs in frequent exacerbations, and is rarely or never altogether absent in a dull or numb form. In all the cases I have seen, the remissions were attended by weakness or partial palsy of the muscles affected; and the complaint was symptomatic of organic lesion in either the brain or spinal chord; apoplectic, epileptic, or paralytic attacks generally occurring after longer or shorter periods. A lady from Gravesend consulted me a few years since for neuralgic pain of the muscles of one side, and particularly of those of the shoulder and arm of that side. After many months of suffering, maniacal delirium and palsy supervened. Several large tubercular formations were found in the brain after death, similar

to those described in the article BRAIN (§ 111.). Indeed, as Dr. SEYMOUR has very justly insisted, those severe neuralgic pains in the muscles or limbs should always lead to suspicion of the existence of softening or other organic lesions or formations in the substance of the brain. In two cases, when the muscular pains were most acute in the thighs, and were attended by occasional cramps, and were followed by weak and irregular action of them on volition, amounting to partial paralysis, extensive organic change was found in the spinal chord and its membranes. (See SPINE and SPINAL CHORD.)

39. *b.* The painful affections of the *periosteum*, attributed to syphilis or to mercury, as Dr. T. THOMSON has suggested, are in many respects neuralgic. The painful affections noticed so fully in the article HYSTERIA (§ 14. *et seq.*) differ from neuralgia chiefly in the seat of irritation causing them — in the affection of the uterine organs. A neuralgic affection of the *skin* has been noticed by some writers, and its connection with herpes and other cutaneous eruptions pointed out. In some states of hysteria the sensibility of the skin is often most painfully increased. The epidemic fever that prevailed in Paris in 1828, and in some of the West India Isles, was attended by pricking and severe pains in the skin and upper and lower extremities, alternating with numbness. But these symptoms were accompanied with so many others, which often predominated, that they cannot be viewed as constituting a form of neuralgia, although illustrating certain manifestations and morbid associations of this affection.

40. vi. VISCERAL NEURALGIA. — It is unnecessary to notice, otherwise than by enumerating the several visceral affections which, if not truly neuralgic, are in many respects related to neuralgia. Most of these have been duly considered in the several articles or sections of articles devoted to them.—*a.* Certain forms of *headach*, particularly the nervous forms, and those which are limited to one part, or which are attended by violent shooting pains, or are remittent or intermittent, are closely allied to neuralgia, and are generally aggravated and alleviated by the same agents and influences as it. In these cases, the pain is to be referred to the state of some portion of the ganglial nerves supplying the brain, in connection with some change in the state of the cerebral circulation. Indeed, visceral neuralgia, with few exceptions, which will be noticed, may be referred to the ganglial nerves, or may be termed *ganglial neuralgia* — a seat of those complaints pointed out by me as early as 1821 and 1822 in the works noticed in the *references* to this article.

41. *b. Ganglial neuralgia* most frequently occurs in delicate constitutions, and in nervous, melancholic, or lymphatic temperaments. It is more frequent in females than in males, and is caused by all the moral and physical influences which powerfully impress the nervous system. As in *external*, so in *visceral* neuralgia, the course of the affection is intermittent or remittent; but the recurrence of the attacks are less regular in the latter than in the former. And in the visceral as well as the external complaint it may be presumed that more or less of vascular determination or fluxion follows the excessive exaltation of sensibility, at least in some cases. Visceral or ganglial neuralgia may thus be followed by increased secretion, or by other evidences of increased vascular reaction or determination. It is also apt to perpetuate itself, or is more prone to return or to continue after having once appeared; and it seldom leaves after it, or presents upon the examination of fatal cases, lesions sufficient to account for the amount of suffering experienced during life.

42. *c.* The chief *special forms* of visceral neuralgia which present themselves in practice are — 1st. *Neuralgia of the heart*, and particularly that form of it which has been termed *angina pectoris*; — 2d. *Gastrodynia* or *gastralgia*, and its various morbid associations; — 3d. *Colic* and *ileus*, more especially lead colic; — 4th. *Hepatalgia* and *splenalgia*; — 5th. *Nephralgia*; — 6th. *Hysteralgia*; — and 7th. *Mastodynia*. These are all fully noticed either in the articles devoted to them especially, or in sections of the articles on the diseases of the organs in which they are seated; and their pathology is still further illustrated in the article on IRRITATION and its sympathetic relations. The subject of *nephralgia* (see KIDNEYS, § 249.) is well exemplified in the case of intermittent neuralgia of the kidneys described by Dr. MACCULLOCH, in which the secretion of urine was greatly increased. In some slighter states of this affection, occurring in hysterical females, and generally associated with more or less of hysteria, this influence of morbidly exalted sensibility of the nerves of the organ upon secretion, is also fully shown.

43. *d.* Many of the cases of *Hysteralgia*, or *irritable uterus*, as it has been most commonly termed in this country, may be considered as neuralgia of the uterus, although it is ascribed by some writers to congestion of this organ. Doubtless cases sometimes occur of severe pain in the uterus, depending upon, or at least associated with, congestion or chronic inflammation of the neck and mouth of the womb; but there are others of a more truly neuralgic character, which may be discriminated from these by a due exercise of tact and observation (see art. UTERUS, *Painful affection of*,), and which are most successfully treated, according to the principles of cure recommended for neuralgia.

44. *e.* Neuralgia of the *vagina* has been noticed by a few writers. It has been variously described by patients as a most acute burning, or lancinating, or lacerating, or plunging pain. It is usually of short duration, and of frequent recurrence; but it is sometimes attended by a more continued aching or soreness; and the attacks are after intervals of various and sometimes of very long duration. In its idiopathic form there is no appreciable lesion of the vulva, vagina, or uterus, but it is occasionally symptomatic of organic lesion of the womb, and the patient is usually fearful of cancerous or other serious mischief being present. It has been imputed to cold or astringent injections for the cure of leucorrhœa, to sitting on cold or damp seats, and sitting on stones or on the ground; to excesses in coition, and to other causes of neuralgia; but certain of these are matters rather of inference than of ascertained occurrence.

45. vii. NEURALGIA OF NERVES OF ASSOCIATION. —*a.* It is extremely probable that several anomalous painful affections, occurring in paroxysms of extreme agony, which cannot be referred with pre-

cision to a single part or organ, but which affect the *diaphragm, stomach, heart*, and their vicinity, or either of them more or less prominently, are actually instances of neuralgia of these nerves, and the ramifications of them, particularly of the *pneumogastric* and *phrenic nerves*. Several of these affections have been considered as instances of angina pectoris; but although nearly allied to that affection they are more correctly instances of neuralgia of these nerves, the phenomena characterising individual cases varying with the ramifications especially affected, and with the associated affection of ganglial nerves frequently accompanying them. Many of the cases of these neuralgic affections occur in persons who have experienced either regular or irregular attacks of gout, and have hence been viewed as occurrences of retrocedent or misplaced gout, both from this circumstance and from the immediate relief consequent upon the development of that disease in the extremities. Still some of these cases occur either without any previous manifestation of gout, or without any attempts subsequent to their appearance to develop the gouty attack. In a case long attended by Dr. ROOTS and myself, in which the attacks of extreme agony were referable to the diaphragm, heart, and stomach, but sometimes to one of those situations more than to the others, there has been no regular manifestation of gout; and in another occasionally seen by me for twelve or thirteen years, there has been no attempt to develop a paroxysm of that disease since the first occurrence of the visceral neuralgia, although treatment was often prescribed with this intention. In this case the violent attacks of pain in the præcordia, and sometimes also in the stomach, with marked disorder of the heart's action, were often alternated with the most acute pain of the head, generally of some hours' duration, or even longer. Notwithstanding the extreme suffering these two patients have endured for many years — in one case about 10 or 12, in the other for 14 or 15—the general health has not suffered, and no further change beyond that depending upon advancing age can be observed.

46. *b*. Many of the more severe sufferings often complained of by *hypochondriacal* and *hysterical patients*, and which are very generally viewed as either imagined or remarkably exaggerated, owing to the general health being but little impaired, and to the little disturbance evinced by the organs of circulation and locomotion, may be considered as forms of neuralgia affecting chiefly the nerves of organic life or of association. In many cases of *hypochondriasis* and *hysteria*, the most distressing pains are referred to the stomach or to the bowels, to the heart, and to various other viscera; and in some these pains are said either to change their seats from time to time, or to affect several organs, or even to assume different features. The circumstance of these sufferings engaging the entire attention of the patient, and the apprehensions and despondency often attending them, being usually viewed in connection with very slight appearance and evidences of ailment, often lead to a belief in their want of reality; whilst they should be viewed as evidence of greatly impaired energy of the ganglial system of nerves, or even of more serious disorder of these nerves, — of asthenia of this part of the nervous system, associated with a morbid exaltation of its sensibility, and not infrequently with either functional or structural lesion of one or more important organs, particularly of the organs subservient to the perpetuation of organic life. I have had already frequent occasion to remark upon the efforts made by nosologists and systematic writers to point out differences, and to manufacture genera and species as if they were dealing with the distinct objects of natural history, whilst they ought at the same time that they mark differences and modifications of morbid action, to show obvious connections and intimate alliances — such as are so frequently exhibited by hypochondriasis, hysteria, and neuralgia — and more especially visceral neuralgia.

47. III. DIAGNOSIS OF NEURALGIA. — A fully developed case of neuralgia is characterised by the remarkable severity and frequent recurrence of darting or plunging pains, and by the intermittent or remittent forms of the attack. The situation of the pain in the course of a nerve serves to indicate the nature of it, in the less violent cases, whilst the ease caused by pressure, and the absence of fever, of tenderness on firm pressure, of hardness or swelling, and of heat in the seat of the nerve, distinguish these cases from neuritis. This distinction, however, does not always hold, for I shall hereafter have to show that some cases of neuralgia depend upon a congested or slightly inflamed state of the origin or some portion of the nerve. In all cases both of internal and external neuralgia, the effect produced by firm and continued pressure aids the diagnosis; for where pressure gives ease or is well borne the neuralgic character is thereby indicated; and where the neuralgia is associated with congestion or inflammatory action, pressure will indicate their existence.

48. *a*. When the *nerves of the face* are affected in the extreme manner characteristic of tic, the disorder cannot be mistaken for any other. Even when it is attended by spasm or twitchings, &c. of the muscles of the face, it cannot, owing to the seat and violence of the suffering, be confounded with *trismus*; and in even the less severe cases, the recurring nature of the pain sufficiently marks it from the continued pain, increased on the action of the muscles, constituting *rheumatism* of the face, which also is sometimes attended by swelling.

49. *b*. In neuralgia of the *nerves of the trunk* the chief object of the diagnosis is to determine the existence or non-existence of inflammatory action or congestion in the spinal chord, or in its membranes. This can be ascertained only by attention to the history of the case, and by a careful examination of the spine. It is of importance also to ascertain whether or not the pain is dependant upon disease of a viscus near or related to the nerves affected, or to the seat of pain; and this object is to be attained only by careful examination, and by the aids of percussion and auscultation, with due attention to the constitutional and symptomatic phenomena.

50. *c*. The same intentions as the above should guide our inquiries in forming a diagnosis of *visceral neuralgia* from inflammation or congestion, or even from organic disease of the viscera, to which the patient's sufferings are referred: and in these, as well as in others, the continued and persistent character of the pain and other symptoms, tenderness on pressure, heat, swelling, or

distension, febrile commotion, the state of the pulse, of the secretions and excretions, and of the tongue, countenance, and skin, will indicate the presence of inflammation, or of active vascular determination; and in plethoric patients, of congestion; and will point out the treatment which should be adopted, whilst the intermittent, remittent, or periodic pain, the marked intervals of ease, the history of the case, and the circumstances increasing or ameliorating the patient's sufferings, will demonstrate the neuralgic character.

51. *d. Neuralgia of the extremities* can hardly be confounded with any other disease, unless when the ischiatic nerve is affected. *Sciatica* may be mistaken for disease of the *hip-joint*, or of the vertebræ in connection with inflammation or abscess of the *psoæ muscles*, extending to adjoining parts; or these affections may be mistaken for sciatica, the ischiatic nerve, or the nerves contributing to form it, being often inflamed or irritated, or pressed upon, in the course of these maladies. In *psoas abscess*, the pain in the loins, the tenderness in that situation and anteriorly, the acute hectic fever, the continued form of the disease, the obvious tumour and the consequent fluctuation, the direction which the tumour takes either to the groin or to the loins near the sacro-iliac juncture, &c., suffice to distinguish it from true sciatica. In *hip-disease*, or even in spontaneous dislocation of the hip, the situation of the pain, the alteration in the direction and position of the trochanter, and the lengthening and subsequent shortening of the limb, show the nature of the disease.

52. IV. — CAUSES. — *A. Predisposing.* — *Neuralgia* is most frequently observed in the nervous and melancholic temperaments; in persons of a hypochondriacal, hysterical, rheumatic, and gouty diathesis; and in adult and aged subjects. Sex has no very marked influence upon its frequency, although certain of its forms are more frequent in females than in males, whilst other forms are more common in males. It is oftener met with in females about and after the cessation of the menses, than at any other period; and it is more common in the wealthy or easy classes of society than in the poor and laborious. It is more common in cold and humid, than in warm and dry climates. Chronic or prolonged debility, the exhaustion consequent upon acute diseases, and prolonged or neglected dyspepsia; the puerperal states, exhausting discharges, and prolonged or improper lactation; excessive venereal indulgences, menstruation, &c., anxiety of mind, &c., are among the most influential predisposing causes.

53. *B. The exciting causes* are not always clearly ascertained in practice, for whilst some cases are chiefly referable to physical causes acting either upon the *brain* or upon the *nerves*, others can be attributed only to some pre-existing disorder, or pathological condition, which, however, when more closely viewed, often appears as much an associated effect of some anterior morbid state as an efficient cause of this affection. — *a.* There can be no doubt that moral emotions of a powerful kind, prolonged mental excitement or anxiety, habitual exertions of the intellect, prolonged watchings, and other circumstances which affect nervous power and the state of the cerebral circulation, particularly when aided by other exciting causes, will be more or less influential in producing certain of the varieties of neuralgia, more particularly those seated in the nerves of the head or face. BELLINGIERI met with two cases of tic which were caused by fright.

54. *b.* Of all the causes whose operation is well ascertained, there are none more efficient in producing these complaints, particularly when seated in the extremities than exposure to *malaria* and to *damp* and *cold* in any form, — to any of them singly, and more especially when they are conjoined. One of the most important services rendered to medical science in modern times, is to be found in the exposition of the causes and morbid relations of neuralgic affections by Dr. MACCULLOCH. Until that work appeared the influences of malaria in causing the several forms of neuralgia, especially when aided by damp and cold states of the atmosphere, were hardly acknowledged, and the important connections of neuralgic affections with other diseases were entirely overlooked. But, even without any probable operation of malaria, cold and damp, particularly when the exposure to them has been prolonged or frequent; vicissitudes of season and weather — especially in respect of humidity and electrical conditions; the partial abstraction of animal heat by currents of air, by wet clothes or shoes, or by sitting on cold or damp seats, standing or sitting on cold floors, and exposure of the face to cold and wet, or to a snow-storm, especially when outside a carriage, have no mean influence in producing neuralgic complaints. Residing in low and damp cellars or houses; sleeping on the ground or on the ground-floor, or in the open air; low, damp, and miasmatous localities and a clayey soil, are often so productive of these complaints as to impart to them an *endemic* character; and when to these are superadded wet and cold seasons, the prevalence of rains and stormy weather, and electrical vicissitudes of the atmosphere, they may even assume an *epidemic* appearance.

55. Of the influence of local injury, — of foreign substances lodged near to or between the fibriles of a nerve, — of bruises, wounds, &c., — of overstretching a nerve by great efforts, — and of undue or prolonged pressure of a nerve, in the production of both neuralgia and chronic inflammation, notice has been taken in the article NERVES (§ 20.). These produce or perpetuate irritation and inflammatory action or congestion in the portion of nerve thus injured. Indeed some of the pathological causes about to be noticed have a similar effect.

56. *c. The pathological causes and associations of neuralgia* are of much importance as respects the obvious indications of cure which they suggest. Certain of these causes act directly upon the nerves affected, and some even upon the part which is the source and centre of pain, whilst others exert a more distant or sympathetic, and not infrequently a doubtful influence. The same causes as were stated to occasion inflammation of a nerve (§ 33.) may produce neuralgia, and any of the organic lesions of nerves (§ 2. *et seq.* 24. 26.) may have a similar effect. Various structural changes seated at the origin of a nerve, or in the nerve itself, or in contact with it, or so near it as indirectly to implicate it, may occasion either pain or spasm, or both, or palsy, according to the manner in which they either irritate the fibriles devoted to sensation or to motion, or entirely interrupt one or both of these functions. Hence the intimate con-

nection existing between *neuralgic*, *spasmodic*, or *convulsive*, and *paralytic maladies*.

57. The pathological causes which occasionally give rise to neuralgic affections in some one or other of their seats are very numerous, and may be divided into,—1st. those which are *hyperæmial*, or consist of congestion or inflammation in some portion of the nerve, or in its origin;—2d. those which are *anæmial*, or which consist of a deficiency of blood;—3d. those *which occasion irritation* in some portion of the trunk or of the ramifications of a nerve, or even of or near to its origin;—and 4th. those which consist of irritation or other similar disorder of remote but related organs or parts. Several of the pathological conditions comprised under these four categories are probably, on some occasions, mere accidental morbid associations resulting from pre-existing disorder; but they are, with equal probability, in other cases, the active agents of the neuralgic affection. Others of them are concurring or aiding influences in developing the effects of more energetic causes.

58. (*a.*) *Hyperæmia* in any form, general or local, congestive or inflammatory, may either at the origin, or in the course, of a nerve, occasion this affection. Evidence of this is to be found in the appearances observed in some cases after death; in the termination of several in apoplexy or palsy; and in the symptoms and the effects of treatment in other cases. I was consulted several years ago by a gentleman about fifty years of age suffering neuralgia of the head and face: the symptoms indicated active determination of blood to the brain, and he was treated accordingly, and the neuralgia disappeared. Two years afterwards he experienced a return of the affection; and he had just arrived in the vicinity of London from the country to consult me, when he was seized with apoplexy and soon afterwards died. I was called to a lady about fifty years of age, suffering neuralgia referred to inflammatory congestion or similar change within the cranium. Cupping in the nape of the neck, with other means appropriate to these views, were prescribed. She was relieved; but the complaint soon afterwards returned. Her friends then requested a consulting surgeon to see her; and he prescribed large doses of the carbonate of iron. She immediately became maniacally delirious, afterwards hemiplegic, and she soon afterwards died. The family surgeon informed me that the appearances after death indicated intense vascular congestion, with signs of previous inflammation. A gentleman from the country very recently came under my care for chronic diarrhœa of seven years' continuance. He had experienced two attacks of phlebitis of the femoral veins consequent upon having taken the extract of logwood; this medicine having restrained, but not arrested, the diarrhœa. A cautious alterative and derivative treatment was therefore prescribed, and the diarrhœa was slightly abated and the stools improved. But a violent attack of neuralgia supervened,—the pain being seated chiefly in the *right side* of the occiput, and in the frontal branch of the fifth pair of nerves of the *left side*. The increased action of the carotids induced me to prescribe local blood-letting, a blister to the nape of the neck, a blister on the abdomen, &c., and the attack entirely ceased in a short time. But a few days afterwards the phlebitis returned for the third time, but in a less severe form, recovery from it taking place after some days, but the diarrhœa was only moderated.

59. That cerebro-spinal neuralgia is sometimes owing to *venous congestion* or *inflammatory action* in a limited portion *of the spinal chord or its membranes*, or even of the theca vertebralis and the vicinity of the inter-vertebral foramina, cannot be doubted, inasmuch as it is sometimes observed in connection with, and manifestly depending upon, these lesions. In two cases, both of them males between fifty and sixty years of age, the neuralgic pains, sometimes associated with spasm of the abdominal and femoral nerves and muscles, of which they complained for several years, and which ultimately terminated in paraplegia, were ascertained by post-mortem examinations to have arisen from these changes. These cases were frequently seen by the author and other physicians, and the nature of the malady recognised from the first. It is not unusual to observe, associated either with these affections of the spinal chord and its membranes, to which the term spinal irritation has been recently applied, or with inflammation of the constituent structures of the spine, or with caries of the vertebræ, intense neuralgia, or marked pain, generally of a remittent or intermittent kind, in one or more of the spinal nerves, more immediately related to the seat of these lesions. When the vertebræ and their connecting structures are unaffected in these cases, the disease in the spinal chord and its membranes may not be evinced by tenderness on pressing the spinal processes, or by manual examination of the spine, especially in adult or aged males.

60. It is almost unnecessary to add, that inflammation of the nerve itself, a congested or varicose state of the vessels supplying the cellular tissue forming the sheath or connecting the fibriles of the nerves, and the usual consequences of inflammatory action, as the effusion of lymph, or of puriform matter, either in the connecting cellular tissue or around the nerve, &c., will sometimes give rise to neuralgia, or to pain similar to neuralgia, particularly when the larger nerves of the lower extremities are the seat of these changes. This cause, first contended for by Cotugno, has been fully confirmed by Cerillo, Bichat, Siebold, Swan, and others. However, it must be admitted, as will be shown more fully hereafter, that inflammatory changes in the neuralgic nerve are observed only in a small proportion of cases of this complaint; and in most even of these the attendant pain is more permanent, the intervals of ease shorter and less complete, than in those cases of neuralgia where these changes are not discovered.

61. (*b.*) *Anæmia* is much less frequently a cause than a complication of neuralgia; and its influence is more predisposing than exciting. The same remark equally applies to plethora. But it is not unlikely that great deficiency of blood may so affect a portion of the cerebro-spinal axis as to occasion acute pain in some one of its nervous ramifications. But whether a cause or a complication, it is not unusual to meet with evidence of anæmia in some instances, or of general plethora in others, in connection with neuralgic affections. In hysterical females, or in those subject to menorrhagia, more or less deficiency of

blood is sometimes associated with these affections, particularly with visceral neuralgia.

62. *(c.)* The dependence of neuralgia upon *irritation* of a portion of the trunk or ramifications of the affected nerve may be admitted as having been proved in some instances. Sir H. HALFORD, in his *Classical Essays*, has adduced several instances of the dependence of the complaint upon a preternatural deposit of bone, or upon diseased bone. Amongst the most frequent of the former are exostosis in some part or throughout the frontal sinuses; thickening or bony deposits in this situation, or in the ethmoidal and spheroidal bones; ossific deposits in the falciform process or other parts of the dura mater; and exostosis from a fang of a tooth. Thickening or exostosis of the frontal bone, or ossific deposits in the dura mater, may occasion the complaint by affecting the extreme ramifications of the nerve affected, or of some other nerve intimately related to it; but in these cases the connection between the presumed cause and the disorder is not so obvious as in some cases of exostosis or other disease of the fangs of a tooth, or caries, exfoliation, or of the alveolar processes, or disease of the jaw, antrum, &c. Various kinds of tumours have been found in the close vicinity of the trunks as well as the terminations of neuralgic nerves; and ossific deposits in the adjoining vessels, membranes, &c., have likewise been found. That the former may affect the sentient functions of a nerve is very probable; and that the latter may be a consequence as much as a cause of neuralgia, in some instances, is also likely. We cannot with logical precision assign all or even the majority of lesions found after death as the immediate causes of suffering. Some of them are effects of that suffering, and others are either associated results, or merely coincidences, in the varied course it has taken, or effects merely of the intercurrent disorders by which that course has been modified.

63. The irritation or similar affection of the cutaneous extremities of the affected nerve, either by chronic eruptions, as herpes zoster, &c., by superficial injuries, punctures, leech-bites, and cicatrices, has individually occasioned neuralgia. In these cases, as well as those caused by diseased teeth, caries, and exfoliations of bone, &c., the connection of cause and effect has been fully proved by the disappearance of the effect upon the removal of the cause. Thus the removal of diseased bone or teeth has often cured the neuralgic complaint; and suitable applications to a cicatrix, to which a cure of neuralgia was attributed, removed the pain (BRIGHT). In many of the cases which evidently depend upon irritation in these precise situations, the affection may be seated at a considerable distance from its local cause, or it may commence in the very seat of irritation, and suddenly dart to a remote part. Thus, as in the cases adduced by Mr. BELL and M. PIORRY, the pain may commence in a tooth, and suddenly pass to the arm, or even to the neck and trunk; and upon the removal of the tooth all disorder may cease.

64. *(d.)* The cause of neuralgia may consist of *irritation of an organ or part at a distance from, but more or less related to, the seat of suffering*. In several articles in this work, and more fully, and with reference to other articles, in that on IRRITATION, I have shown that disorders of various internal organs or parts may so affect not only other distant *internal* organs, but also remote *external* parts, or those supplied by cerebro-spinal nerves, so as to occasion convulsions, spasms, and morbid exaltations of sensibility. It has been supposed by many that *disorders of the digestive organs* may give rise to neuralgic affections in various situations, and I believe that such disorders — whether consisting of irritation caused by hurtful ingesta, or by the accumulation of acrid or othermise vitiated secretions, may have this effect, not only in these organs themselves, as in gastralgia or gastrodynia, enteralgia or colic, but also in remote but related organs, as the heart, diaphragm, &c.; and even in one or more of the nerves proceeding from the cerebro-spinal axis. The disorders of the digestive organs act in some of these cases as a predisposing cause, and in others as an exciting, or at least as a concurring cause, or in aiding to develope the operation of other causes, some of which may have escaped detection, and hence it may itself appear as the sole efficient agent in producing the neuralgic affection. In estimating the influence of disorders of the alimentary canal in producing this affection, too much has been imputed to it by some, and too little by others. MONTFALCON and ELLIOTSON believe that they have no influence in causing the complaint. This is, however, too extreme an opinion. Doubtless, some of the cases in which these disorders are very prominent, and in which the neuralgic suffering subsides upon their removal, may be viewed as associated effects of a pre-existing morbid condition, probably of the ganglial nervous system. But, that disorders of the digestive organs are without any influence in causing or developing neuralgia is not consistent with the evidence furnished by SWAN, BRODIE, ANDRAL, and others, and by my own experience. That paroxysms of the complaint are cured by cathartics, is an admitted fact; but Dr. ALISON believes that this circumstance proves nothing as to the influence of these disorders upon the complaint, for cathartics may produce a beneficial effect upon it by deriving the blood from the brain and spinal chord. Yet, admitting this effect of cathartics, still these disorders are not without some influence, and the fact is much too important to be disregarded in practice, however it may be attempted to account for it. I have, both in the article IRRITATION, and in other articles and works, attempted to show that disorders of the digestive organs, and even of other organs, as of the urinary, &c., may be directly extended by means of the ramifications of the ganglial system to distant internal organs in some cases, and be there expressed by spasmodic action, or morbidly excited sensibility; or to the roots or even to the ramifications of cerebro-spinal nerves, in other cases, giving rise to similar morbid manifestations of muscular motion and sensation. I have met with several instances in which fæcal accumulations in the cæcum and sigmoid flexure of the colon, and internal hæmorrhoids have been attended by severe neuralgia of the lower extremities, and as soon as these have been removed this affection has ceased. (See Notes and Appendix to *M. Richerand's Elements of Physiology, by the Author* (p. 546. 562. *et passim*), and article IRRITATION, *passim*.)

65. *(e.)* *Diseases of the urinary organs* sometimes give rise to severe neuralgic pains, generally

in the extremities. Instances of this cause of the complaint have been furnished by Sir B. BRODIE, Dr. ROWLAND, and others. Mr. SWAN mentions a case where severe pain of the backs of the fingers was induced by evacuating the bladder when much distended. A similar case was observed by the author, the pain being most severe under the nails, and along the backs of the fingers. I have seen stricture of the urethra apparently the cause of slight aguish attacks, and of intermittent nervous affections of a painful and spasmodic nature.

66. (*f*) That *irritation of the extremities of the nerves* will occasion neuralgia in some of the branches of the same, or of intimately-connected nerves, appears to be proved not only by the occurrence of this affection after superficial injuries and cutaneous eruptions (§ 63.), but also by the circumstance of severe frontal neuralgia having been caused by the larvæ of insects in the frontal sinus, a case of which occurred in a member of my own family; the larva escaped after a severe fit of sneezing, and the pain immediately ceased.

67. V. COMPLICATIONS.—Several of the pathological states just adduced as causes of neuralgia, may be considered with equal propriety as complications, or as associated results of some anterior disorder, particularly affecting the ganglial nervous system, as I attempted to show many years ago. The most common of these associations are irritation, congestion or other disease of the spinal chord or of its membranes; caries or inflammation of the intervertrebal substance or vertebræ; hysteria, and uterine disorders; epilepsy and other convulsive affections; disorders of the digestive organs; fæcal accumulations in the cæcum or sigmoid flexure of the colon, or disease of the rectum; ague, rheumatism, and catarrh; paralytic affections; internal abdominal and pelvic tumours; disease of the hip-joint, and psoas abscess. There are occasionally other complications of neuralgia met with in practice, but these are chiefly accidental, or at least less intimately connected than the above with this affection.

68. *A*. The connection subsisting between neuralgia and many of the disorders now enumerated is very obvious: certain of them, although frequently the primary affection, are sometimes consecutive, and more of them are merely consequences of pre-existing morbid conditions, one or other appearing earlier or in a more prominent manner in some instances than in others. *Diseases of the spine*, or *of the hip-joint*, *psoas abscess*, and *fæcal accumulations*, &c. in the large bowels, are generally a pathological cause of neuralgia, although often also associated results of previous disorder. The same remark applies also to other *derangements of the digestive organs*, to *hysteria*, and to *spinal irritation or congestion*, although they are more frequently pure complications than the foregoing. The occasional complication *of ague*, *rheumatism*, or *catarrh*, with neuralgia, — complications not infrequently observed,—are merely the associated effects produced by malaria, cold and wet, and currents of air. I have seen neuralgia conjoined with obscure or irregular attacks of ague, and as the former became less violent the true character of ague was more distinctly and regularly developed. In cases of sciatica the rheumatic character is often very prominent, or rheumatism of other parts sometimes alternates or is associated with the sciatic affection. The same is occasionally also remarked in respect of toothache and rheumatism of the face.

69. *B*. *Epilepsy* and *convulsive* or *spasmodic affections* are often the external manifestations of the same lesion which occasions neuralgia, the one alternating with or to a certain extent accompanying the other. Indeed, the same local lesion which produces intense pain, may in a different grade, or as it extends to the nerves of motion, occasion spasm or convulsion; and, in a still more advanced grade, *loss of sensation*, or *of motion*, or of both functions. Of this I have met with several instances, when the primary lesion was seated within the cranium or spinal canal. In some cases severe pain has been experienced in different parts of the lower extremities, afterwards the pain has been attended by cramps in the muscles of these extremities, or of the abdomen; these have recurred at intervals and have been followed by weak, imperfect, and irregular action of these muscles, giving the patient an unsteady, and partially paralysed gait, in some cases resembling paralysis agitans, in others chorea, or an intermediate state.

70. That neuralgia and epilepsy may be associated effects of the same lesion, the latter appearing consecutively on the former as the primary lesion increased, was demonstrated to me many years ago in the case of a compositor in a printing office, who complained of most severe neuralgic pains in the left hand, which generally originated in the situation where the metal composing-stick pressed most during his work. As the intensity of the pain increased, regular attacks of epilepsy supervened; but disappeared with the removal of the local affection and its cause. *Painters' colic* may be considered as a form of visceral neuralgia, and this affection I have seen associated with epilepsy on two or three occasions.

71. VI. TERMINATIONS AND PROGNOSIS.—Neuralgic affections terminate — 1st. in health; 2d. in some other disease; 3d. in death.—*A*. A *return to health* is a most frequent termination of neuralgia of the nerves of the lower extremities, whilst neuralgia of the face and head is most liable to prove obstinate, to return, or to terminate unfavourably. The result in all cases and seats of the affection depends upon the exciting cause of it. When it proceeds from malaria, or from cold and wet, or from any of the more passing and external physical causes, it is generally soon removed by decided means early prescribed. Yet, even in these cases, a first attack leaves behind it a predisposition to return upon exposure to the exciting causes, although those causes may be less energetic than those which first occasioned it.

72. *B*. When neuralgia cannot be imputed to these causes, — when it is occasioned by less manifest causes, — when there is reason to suppose that some organic lesion exists within either the cranium or spine, a protracted disease may be expected, and the *supervention of another malady*, generally resulting from the progressive increase of the primary lesion, and of a still more fatal tendency, may be anticipated, although at a more or less remote period. In a very large majority of these cases neuralgia terminates in some related malady — in a convulsive, epileptic, apoplectic, or paralytic seizure. From either of these the patient may recover partially, rarely completely, and be

again attacked, but he seldom experiences the neuralgic affection, or at least in the same form or degree of severity. Of the several maladies into which neuralgia passes, palsy, generally in the form of hemiplegia, sometimes in that of paraplegia, when the lower extremities have been the seat of the affection, has been that most frequently brought under my own observation. Next to this, apoplectic, or apoplectic conjoined with convulsive seizures have been noticed.

73. *C.* It is chiefly, if not entirely by passing into the apoplectic, epileptic or convulsive, or the universally paralytic states, that *this affection terminates in death*, such termination sometimes taking place more or less suddenly, upon the occurrence of the first seizure, or not until after two or more recurrences or exacerbations of the seizure. A gentleman from the country consulted me for facial neuralgia. He continued tolerably free from the affection during nearly two years, when a severe attack occurred, followed by convulsions, which rapidly passed into apoplexy and death. Another experienced an attack of apoplexy attended by convulsions, that supervened upon neuralgia. I found him partially recovered from this attack. He had been very largely blooded, and the pulse indicated an excessive loss of blood; yet another attack took place nevertheless, within 48 hours, and speedily terminated life. Whether or not he could have recovered from the first attack without the large depletion is difficult to determine. Still, as I have remarked in the Articles APOPLEXY and CONVULSIONS, I have rarely seen large blood-lettings beneficial, more frequently I have observed them prejudicial, in seizures attended by convulsions. In these cases, it is better to wait, or to employ other measures less likely to be prejudicial, than to bleed largely with the view of recovering the patient from the seizure, which cannot always be arrested at once, or recovered from under some time after having been developed. *Time*, I may here remark, is a necessary element in the process of recovery; and if due time be not allowed for the procession of phenomena terminating in a return to health, but disturbing, officious, or exhausting measures be adopted to hasten what admits not of being accelerated, serious mischief may accrue.

74. VII. THE APPEARANCES OBSERVED IN FATAL CASES, particularly of neuralgia of the face, have been the majority of those found in the membranes and substance of the BRAIN, and bones of the CRANIUM (see art. BRAIN and CRANIUM), more especially tumours, and ossific deposits in the dura mater, and near the base of the brain or cranium; exostosis, great thickening, and even caries of some parts of the cranial bones in the vicinity of the affected nerves; and many of the structural lesions already mentioned as pathological causes of the affection (§§ 62, 63.). Various changes of structure found both in the brain and membranes, and in remote viscera, may be only coincidences or the effects of protracted suffering upon the circulation in the brain. Softening of parts of the brain, effusions of blood, and even ossific deposits in the membranes, or in the coats of the arteries, sometimes observed in cases terminating in apoplexy or palsy, may be altogether or partly consequences of the repeated returns of the neuralgic affection; morbid sensation exciting, or otherwise changing, capillary action in related portions of the brain and its membranes. Still such cases as have been recorded by Sir H. HALFORD, TYRRELL, MONTAULT, and others, where bony deposits, fungous tumours of the dura mater, &c., implicating the fifth pair of nerves, compel our belief that these lesions have been concerned in causing the affection. In some cases of neuralgia of the lower extremities, signs of chronic inflammation of the trunk of the nerve, or the more usual consequences of this state of vascular action, particularly injection and enlargement of the capillaries of the nerve, thickening, discolouration, &c., of the connecting cellular tissue, have been remarked by COTUGNO, CIRILLO, SIEBOLD, BICHAT, ROUSSET, and SWAN; whilst in other cases no change could be detected in the nerves themselves by DESSAULT, WARDROP, BICHAT, ANDRAL, and others; nor even in the nervous centres, when the patient did not die of any of the diseases of these parts just mentioned, as frequent terminations of neuralgia. In cases of visceral neuralgia, inflammatory changes have been remarked in the ganglia by LOBSTEIN, SWAN, and others; but it is difficult to estimate the morbid amount of vascularity of these parts of the nervous system, as it varies very much in this respect even in health.

75. VIII. THE NATURE OF NEURALGIA must necessarily be estimated, 1. partly from the general character of the local and constitutional symptoms attending it; 2. partly from the appearances observed in fatal cases; 3. partly from its relation to other maladies, into which it often passes; and 4. partly from the influence exerted upon it by medicinal agents. — (*a*). That the local and constitutional symptoms accompanying neuralgia, are different from those of acute neuritis have been shown both in the art. NERVES (§§ 23. 27.), and above (§ 5.). Still there may exist, in some of the more persistent and continued, or even in the merely remittent states of neuralgia, chronic inflammation at the origin, or in some part of the trunk, of the nerve affected. The absence of fever and of tenderness on firm pressure, although indicating the absence of inflammation, in the majority of cases, still should not be estimated as precluding the existence of chronic inflammatory action in all of them. The absence of fever, &c., is no proof of the absence of the slighter states or more chronic forms of inflammation of the affected nerve or parts intimately related to it. In those cases where there is most reason to suppose that the complaint is independent of inflammation, the pulse even falls in frequency during the severity of the paroxysm. The absence, however, of all appearances and consequences of inflammation in some of the fatal cases prove strongly, that neuralgia is at least occasionally independent of this state of vascular action. The nature of the exciting causes, and the characters of the other diseases with which it is often allied, or into which it occasionally passes, indicate that neuralgia varies in its nature in different cases, — that it may proceed from chronic inflammatory irritation about the origin, or in the course of the nerve in some instances; and from a state of partial or slight pressure on the nerve in others. That it may even arise from a deficient or interrupted circulation of blood at the origin, or in the trunk of the nerve, is merely a supposition, that hardly admits of positive proof. The

circumstance of neuralgia terminating so frequently in palsy is no evidence of this being its immediate cause, for palsy proceeds more frequently from the consequences of inflammatory action in portions of the nervous centres related to the paralysed part, — from disorganisation or organic lesion, — from inflammatory softening, sanguineous effusion, &c., — than from deficient or interrupted circulation of blood, although this state of the circulation in parts of the nervous centres probably causes palsy in some instances.

76. Those cases of neuralgia which are unequivocally caused by malaria, which are completely intermittent, and which are devoid of febrile commotion, or of tenderness of the nerve upon firm pressure, may be viewed as non-inflammatory; but, it may be asked, what then is the nature of the affection? Does the disorder, in these cases, proceed from slight pressure of the nerve at its origin or in its course, or from a suppositious state of irritation, of which irritation we know as little as of the nature of the pain of which it is assigned as the cause? Is it merely a disturbance of function? The effect of treatment furnishes no very conclusive evidence of the nature of the affection, — not even of its inflammatory or non-inflammatory character. For even in those cases where evidence of the existence of inflammatory action is the strongest, even there an energetic exhibition of tonics, as of camphor, quinine, iron, &c., will often effect a cure. We know, at least I have fully satisfied myself, and I have shown in this work, that these remedies will often cure inflammations of the circulating vessels; and we may therefore infer that they may prove equally serviceable in neuritis; although we may find them still more beneficial in neuralgia of a purely non-inflammatory character.

77. Concluding, therefore, that those affections, to which the name neuralgic has been applied, may be viewed as more or less inflammatory in some instances, and non-inflammatory or functional in others, and that great advantages will accrue in practice from the science and acumen which enable the physician to distinguish between these, or to estimate how much of either character may be present, it will next be inquired, having found a certain palpable condition to which the disease is to be imputed only in some cases, to what is it to be attributed in those other instances where that condition is supposed not to exist? Now those other instances have been said to proceed from irritation, altering the sensibility of the nerve, which either is the seat of this irritation, or manifests it from an intimate relation to the irritated part. In these cases the violent pain is often the chief, if not the only cognisable disorder. Its dependence upon inflammation is not entertained for the reasons above assigned, in connection with its sudden occurrence, and as sudden cessation — phenomena hardly to be explained by assigning inflammation as their cause. The affection has been viewed as *functional* in such circumstances as *morbid exaltations of sensation*, as the result of *irritation* of the nerve or of parts related to it. This, however, is merely a play upon words — a confession of our ignorance; for, to say that intense pain is a morbid exaltation of sensation, is a consequence of irritation, is merely a nervous disorder or affection, and so on, is explaining nothing, is merely substituting terms for the concealment of our ignorance, or with the vain hope that we are evincing our knowledge.

78. Considerable practical knowledge of neuralgic affections has suggested the following inferences: — 1. That these affections often proceed from chronic inflammatory action in some part of a nerve, or of a part intimately related to it. — 2. That the exciting causes of the affection should be kept in view when we estimate the inflammatory or non-inflammatory character of it. — 3. That, even in those cases which present no inflammatory character, some pre-existing affection or disorder of related parts, especially of the nervous centres and internal viscera should be suspected and searched after. — 4. That, in the non-inflammatory cases especially, the neuralgic disorder should be generally viewed as an external manifestation of some latent internal disorder, which a patient investigation of the case, with due acumen, will frequently detect, and which, when once detected, will suggest the only permanently successful and safe indications of cure. — 5. That the connection of these affections with gout, rheumatism, hysteria, &c. should not be overlooked; nor the tendency they often evince to terminate in palsy, epilepsy, or apoplexy be neglected, in estimating the morbid relations and nature of individual cases, and in determining the indications of cure most appropriate to each. — 6. That the one-sided views published of the subject, the vaunted success of certain remedies for the cure of the affection, the publication of successful cases, to the neglect of the unsuccessful; and the silence as to the ultimate result of many cases, or as to the diseases which appeared at some period after a supposed cure, which has been preserved, have all tended to mislead the inexperienced as to these affections. — 7. That the suppression of the neuralgic affection by powerful tonics and stimulants, or by the more energetic narcotics, without due reference to, or an accurate estimate of, the states of the most important viscera, has sometimes proved injurious; and that, although the neuralgic affection has apparently ceased altogether, and for a considerable time, still some severe visceral disease, or an apoplectic, epileptic, or paralytic seizure not infrequently supervenes, and endangers, or carries off, the supposed case of cured neuralgia.

IX. Treatment of Neuralgic Affections.

79. *A.* From what has been advanced above as to the *physical* and *pathological causes* and *associations of neuralgia*, it is obvious that our *first* and most strenuous endeavours should be directed to ascertain and to remove these. When the symptoms are such as indicate, or even to render very probable, the existence of an inflammatory state of the nerve, more especially in young, robust, or plethoric subjects, or when the disease has appeared after suppressed discharges, or the disappearance of eruptions, &c., the treatment in the first instance should be that advised for Neuritis, more especially local *blood-lettings*, *derivatives*, and *counter-irritants*. I have seen recent attacks of neuralgia, with these characters, removed by these means alone, in a very short time. When any evidence is furnished of disorder in the nervous centres, or in any important viscus, the treatment suited to such disorder should be decidedly and promptly prescribed before the more common neuralgic remedies are had recourse to;

and in all complications, as well as in all instances caused by pre-existing disorder or lesion, the associated affection should receive immediate attention, and the means afterwards directed for the removal of the neuralgic affection ought to be such as may either not endanger a return of the complication, or may tend to its permanent removal. In such circumstances *blood-letting*, cautiously employed, is often extremely beneficial, and renders the means subsequently prescribed much more efficacious. The same remark applies to chologogue and alterative *purgatives* when thus early and appropriately prescribed.

80. *B.* Having removed the causes, as far as this intention can be accomplished, and had recourse to such antiphlogistic means as the state of the case and of the patient permitted, the morbid associations of the affection having received due attention, in the use of these and other remedies, the treatment may be directed more especially to the neuralgia, according to the characters it may present, and to the diathesis of the patient. In the distinctly intermittent form of the affection, and if there be no determination of blood to the head, or no active visceral disease, the preparations of iron, or of bark, or quinine, conjoined with such other remedies as the peculiarities of the case will suggest, may be given, or other remedies, about to be noticed, may be tried. At the same time that tonic, anti-spasmodic, antiperiodic, and narcotic medicines are being administered internally, various *external means* may be applied, according to the seat, character, and duration of the affection. In the cases caused by malaria or cold and humidity, quinine, cinchona, camphor, arsenic, &c., are especially appropriate. In the more strictly nervous or hysterical, and in cases connected with a deficiency of blood, the preparations of iron, of opium, of belladonna, &c., are most suitable. In the rheumatic and gouty diatheses, the fixed alkalies and alkaline earths with colchicum and ammonia, aconite with camphor, &c., are most successful, especially after biliary and other secretions have been evacuated by an active exhibition of chologogue purgatives.

81. *C.* When neuralgia appears to proceed from disease within the cranium, or near the origins of the affected nerves, as in the cases observed by myself and others, and already referred to, a seton or issue should be established in a situation selected with reference to the inferred lesion, and an alterative course of treatment, aided by narcotics, ought to be preferred, such as the iodide of potassium with liquor potassæ, Plummer's pill with soap and opium, the iodide of mercury with stramonium or belladonna. In some of these cases, the application of a few leeches behind the ears, or to the spine, when the latter is the seat of irritation, or a small cupping in the same situations, and the repetition of these according to circumstances, will prove of service.

82. *D.* Cases will occur of the failure of means directed according to the principles now stated; the utmost care in ascertaining the physical and pathological causes and morbid associations of neuralgia, and our best endeavours to remove them, being altogether unsuccessful. In these, we must have recourse to more empirical measures, yet even these measures must not be blindly, but rationally prescribed. This brings me to the consideration of the principal remedies which have been employed against this complaint, according either to rational views and principles of treatment, or to a vague empiricism. In noticing, therefore, these remedies, I shall mention the states of the disorder in which I believe each of them to be most appropriate, and the combinations in which my experience has shown them to be most efficacious.

83. *a.* Evacuants are more frequently required in neuralgic affections than has been generally inculcated; but not so much on account of any general fulness of the vascular system, as of local congestion, or an irregular distribution of the blood, owing to impaired tone of the vital energies generally, and to deficient or impaired secretion and excretion. — *a.* The propriety of having recourse to *bloodletting*, and particularly to local *bloodletting*, and even the repetition of it in some instances, and the circumstances requiring this treatment, have been already noticed (§ 79.). — *b. Emetics* have very rarely been advised in neuralgic disorders, and yet cases occasionally are met with in which an emetic proves a good initiative remedy, particularly in promoting the removal of vitiated secretions from the biliary passages. Emetics are indicated chiefly in neuralgic affections of the trunk, or where there is evidence of congestion and impaired function of any of the abdominal viscera.

84. *c. Purgatives* have been very generally recommended. They are beneficial not only as evacuants of morbid secretions and fæcal accumulations, sometimes the primary source of irritation, but also as derivatives, particularly when the more drastic purgatives are prescribed. They, moreover, promote secretion and excretion, and remove visceral congestions. Sir C. Bell and Dr. Allnatt have praised the decided exhibition of *croton oil* as a purgative, and some more recent observers have noticed its good effects, and have viewed it as exerting an alterative effect similar to that produced by colchicum upon the urinary functions. I gave it many years ago in a case of neuralgia of the right pillars of the fauces and side of the tongue, and the patient continued free from the disease for more than a year, when an attack occurred and proved much more obstinate than the former, the means, which were formerly successful, failing on this occasion. *Chologogue purgatives* are often preferable to any other when prescribed with decision, and aided by anodynes. In 1820 I treated a case of infra-orbital neuralgia, and in 1821 a case of sciatica, as follows: —

No. 296. ℞ Calomelanos gr. xij; Pulv. Ipecacuanhæ, Pulv. Opii, āā, gr. ij. Mucilag. q. s. *m.* Fiant Pilulæ iij, horâ somni sumendæ.

No. 297. ℞ Infusi Sennæ Comp. ℥vss; Magnesiæ Sulph. ℥ss.; Magnes. Carb. ʒss.; Vini Colchici ʒjss. Tinct. Sennæ Co. ʒiij; Tinct. Cardamom. Co. ʒij; — Tinct. Opii, ♏ xv. *m.* Fiat Mist. cujus capiat partem tertiam ter in die. (Horâ 7a A. M., horâ 11a A. M., et horâ 3tia P. M.)

85. In these cases the complaint was removed in four days, alleviation of suffering being apparent in both within twenty-four hours after the first dose of pills. Rahn, Wilson, and many others have recommended cathartics, and when there is little or no visceral obstruction or congestion, any of the more active and certain purgatives may be prescribed, particularly when a derivative operation merely is desired to be produced. In neuralgia, however, of the lower ex-

tremities, I have preferred equal parts of *spirits of turpentine* and *castor oil* (℥ss. of each) taken on the surface of mint-water or milk, containing some calcined magnesia, to other purgatives, calomel with colchicum and ginger, or calomel with ipecacuanha and opium, being given occasionally at night when visceral obstruction or congestion was present. Purgatives are more particularly indicated in neuralgia of the lower extremities which is not infrequently induced by fæcal accumulations in the colon and sigmoid flexure of the colon. Their good effects are often promoted by an occasional enema with ol. terebinthinæ and castor oil.

86. *β*. ALTERATIVES AND DEOBSTRUENTS are especially indicated when neuralgia appears to depend upon visceral obstruction or structural change near the origin or in the course of the affected nerve, and in cases of visceral neuralgia. Under this head may be comprised various substances, whose beneficial operation may be differently explained. The alteratives most frequently employed are the preparations of *mercury*, of *iodine*, and of *arsenic*, variously combined. — *a*. Dr. CORKINDALE prescribed *calomel* with opium, and LOEBENSTEIN-LOEBEL, calomel with the golden sulphuret of antimony and opium, until the gums became affected. HILDENBRAND and HERRMANN often pushed *mercurials* to the production of salivation. SCHLESIER preferred the bichloride of mercury, two grains of it being dissolved with three grains of the extract of stramonium in an ounce and a half of distilled water, and from thirty to fifty drops being taken every second hour.

87. *b*. I have given the preparations of *iodine*, particularly the iodide of potassium with liquor potassæ and narcotics, the iodide of mercury, and the iodide of iron. The first and second of these preparations are most appropriate when the complaint appears to depend upon organic change within the cranium or spine; the last where it is more strictly nervous, and where it is connected with uterine obstruction. In some neuralgic affections referable to the diaphragm, heart, and stomach, or passing from the one to the other, and presenting a gouty character, the iodide of potassium, with liquor potassæ and opium, was extremely beneficial.

88. *c*. The preparations of *arsenic* are more strictly alteratives and antiperiodics than tonics. They have been very generally prescribed for neuralgic complaints. They have been much confided in by NESSE-HILL, BASSEDOW, BEDINGFIELD, HALLIDAY, and ROWLAND. They are most successful in the more functional states of the complaint, particularly when they are caused by malaria, and exposure to cold. They are also serviceable in those forms of it which are intimately allied to hysteria and are associated with congestion of the uterus or with disordered menstruation. They may be conjoined with any of the narcotics hereafter noticed (§ 96. *et. seq.*).

89. *d*. *Spirits of turpentine*, as usually given for the cure of neuralgia, acts more as an alterative than as a stimulant, diuretic, and aperient, in all which ways it exerts considerable influence. Dr. HOME (*Clin. Experim. and Hist.* p. 247.) remarks, that having found, in one of Dr. CHEYNE's philosophico-medical works, a receipt composed of oleum terebinthinæ and honey for the cure of sciatica, he tried it and found it to succeed; and that he has used it for many years and found it "an efficacious and valuable medicine." Dr. DARWIN (*Zoonomia*, vol. ii. s. iii. ch. 2.) also had recourse to oil of turpentine, both in this form of neuralgia and in lumbago. It was afterwards prescribed by myself, and the results of my experience of it in neuralgia and many other diseases, published in the *London Medical and Physical Journal* for August 1821. M. MARTINET also about the same time recommended it for sciatica. PITCAIRN, CHEYNE, and HOME, who first employed this substance against sciatica, usually gave in doses of about fifteen or twenty drops in the form of linctus with honey. At first I prescribed it as follows in neuralgic affections, but I subsequently varied the dose and the modes of exhibiting it, with the circumstances of the case, seldom giving less than half a drachm for a dose.

No. 298. ℞ Olei Terebinthinæ; Tinct. Guaiaci Ammoniatæ, āā, ʒiij; Mellis Opt. ℥ij; Olei Cajuputi ♏ xii; Olei Limonis ♏ vi. Misce ut fiat Linctus: Cochleare unum minimum bis terve de die sumendum.

This medicine, although recommended chiefly for sciatica, is frequently of great service, if not equally beneficial, in other forms of neuralgia; for all which it may be employed in various forms, as with calcined magnesia, on the surface of milk, or of an aromatic water, &c. When the eructations, &c. after taking it are unpleasant, magnesia is often of service, and moreover promotes its operation on the bowels. Sometimes a large dose of the turpentine — from three to six drachms — taken at once or with half an ounce of castor oil, on the surface of milk or mint-water, almost immediately removes the complaint. In neuralgia of the lower extremities enemata containing it are often beneficial. CHEYNE recommended equal parts of spirits of turpentine and alcohol to be distilled together, and from one to four drachms of this compound to be taken daily. He supposed that, in this manner, the turpentine was deprived of many of the inconveniences attending it in other forms. Turpentine has lately been much employed, particularly in sciatica, in France and Germany, where it has received the praises of ELGENSTIERNA, CLOQUET, LARROQUE, DUFAUX, PIORRY, TROUSSEAU, MOST, DUCROIS, and others. A strong recommendation of this medicine is to be found in its being equally appropriate to the inflammatory and non-inflammatory states of the affection; and in the fact of relapses or a return of the complaint being less frequent after the use of it, than after any other remedy.

90. *e*. The use of *cod-liver oil* may be noticed at this place. It has been long recommended for rheumatism and sciatica, and more recently for the several forms of neuralgia. As usually prepared and kept, it is a nauseous medicine; and I doubt much its efficacy over the oil procured from the livers of several other fish. That obtained from the liver of the skate is equally beneficial; and that yielded by the liver of the ling superior to both. But the oil from the liver of the torsk, or the *gadus brosma*, a remarkably fine fish caught only on the coasts of Shetland, Faroe, and of some parts of Norway, is esteemed much above all others by the inhabitants of these parts, and is much employed by them as a domestic medicine; the fresh liver and oil being considered an article of great delicacy, when cooked in such a way as to prevent, as much as possible, the separation of

the oil from the liver.* The quantity of these oils which may be taken for neuralgic and rheumatic complaints is as much as the stomach will tolerate.

91. γ. STIMULANTS, TONICS, AND ANTISPASMODICS. — There is scarcely a substance which may be ranked under this head, that has not been tried against neuralgia. — *a.* The preparations of *cinchona* and the sulphate of *quinine* have been very generally used: the latter, however, has recently superseded the former, although not always with justice. The more energetic preparations of cinchona, conjoined with very full doses of the alkalies or alkaline carbonates, or with opium, as advised by SCHENK and KERRISON, or with the sulphuric æther, as prescribed by LASSERE, have succeeded in some cases where quinine has failed. The *sulphate of quinine* has, on the other hand, been said to succeed when cinchona in decoction or powder has been unsuccessful. When, however, the bark has been given as just advised, or with serpentaria, capsicum, camphor or ammonia, or with chlorate of potass, much more dependence may be placed on its efficacy. I have rarely trusted to quinine alone in this affection, but have prescribed it with the sulphate of iron, camphor, capsicum, and extract of conium or henbane, after the bowels have been freely evacuated by suitable purgatives. In a most severe case of sciatica of which a surgeon retired from service in India was the subject, this latter combination proved very quickly and permanently efficacious. Both bark and quinine are most successful in cases caused by malaria or by wet or cold, and when the affection is intermittent or is chiefly functional. They often fail when the complaint presents remissions only, when it appears to depend upon chronic inflammatory action or upon a permanent source of irritation. If employed at all in these cases, local bloodlettings and active purgatives should precede them, the latter being given from time to time during their use.

92. *b.* The *preparations of iron* have obtained great reputation for the cure of neuralgia, especially since the *sesqui-oxyde* was recommended for it by Dr. HUTCHINSON, and given in large doses by ELLIOTSON and others. The full efficacy of this substance may be obtained in doses of from half a drachm to a drachm, three or four times a day, conjoined with an aperient, or a smart purgative being given occasionally. This and the other preparations of iron are indicated chiefly in the same circumstances of the complaint as have been just stated to require cinchona or quinine; and when there is a deficiency of blood, or at least no general plethora or inflammatory action. The *sulphate of iron* is often not less beneficial than the carbonate, and it may be prescribed with other medicines as above stated (§ 91.). The *hydrocyanate of iron* has been used by MM. DUPUY and JOLLY in the following form: —

No. 299. ℞ Hydrocyan. Ferri gr. xviii.; Quininæ Sulph. gr. xii.; Extr. Opii gr. i.; Conserv. Rosæ q. s. ut fiant Pilulæ xii. Capiat unam 2dis vel 3tiis horis.

93. *c.* The preparations of *zinc* have been prescribed for neuralgia, but chiefly in combination with some one of the narcotics about to be noticed. The *sulphate* was preferred by MEGLIN, and the chloruret or *chloride* by HANKE, who directs one grain of it to be dissolved in two drachms of chloric æther, and from five to ten drops of the solution to be given every fourth hour in sugared water. The *chlorate of potash* has been praised by HELMENSTREIT and MEIER, who gave it in doses of from three to five grains every fourth or fifth hour. I have prescribed it in somewhat larger doses in the decoction of bark or infusion of valerian. It is not devoid of efficacy in the rheumatic and hysterical states of the disease.

94. *d. Nux vomica* and *strychnia* have lately been suggested in the treatment of neuralgia. LINNÆUS gave the former in gastralgia; and I have prescribed the alcoholic extract of it in a few instances — in one or two with decided service, but in others with doubtful advantage. This preparation is in many respects preferable to strychnine, both in this and in paralytic affections; but it is not suited to the more continued and inflammatory states of this disorder. The same remark applies to *Phosphorus*, which has been employed by LŒBENSTEIN-LŒBEL, dissolved in oil, of which, however, I have had no experience.

95. *e.* Of *camphor*, given in tolerably large doses, with opium or some other narcotic, or with quinine or sulphate of iron, I entertain a favourable opinion, as well as of *valerian* and *guaiacum*, the ammoniated tincture of these being the preparations I have preferred. SCHNEIDER employed the oil of valerian both internally and externally by friction. The preparations of guaiacum with colchicum or, with aconite, and the alkaline carbonates, are most useful in the rheumatic forms of neuralgia. *Musk* has been prescribed by BEAUMES, and by J. FRANK conjoined with calomel and antimony.

96. δ. NARCOTICS AND SEDATIVES. — *a.* The several preparations of *opium*, and more recently the salts of *morphia*, have been prescribed in this class of affections, in various combinations, and with different effects. I have found them of service in full doses with calomel, camphor, and ipecacuanha, particularly in sciatica, after the bowels have been freely evacuated; and in *toothach*, *opiates* with camphor, creasote, and capsicum, applied to the gums, or to a carious tooth, often affords relief. RECAMIER advises the following pills in neuralgia: —

No. 300. ℞ Pulv. Opii puri; Pulv. Ipecacuanhæ, āā,

---

* Of the oil from the livers of the torsk, ling, and cod, I can speak from experience. When obtained from the fresh livers, and used before it becomes rancid, it is not unpalatable, and does not offend the stomach. The fishermen in the parts above mentioned usually employ it as the only sauce to either of these fish; and I have very frequently partaken of it in this manner, and esteemed it above any other sauce. But the livers of these fish (that of the torsk more especially, it being prized much above the others), when prepared in the following way, are admirable articles of diet for the complaints under consideration, as well as for rheumatism and some others. The stomach of the fish is well washed, two parts filled with the fresh liver, and firmly tied at each end, so as not to allow any of the oil to escape whilst being boiled. When ate quite warm, with a little salt and spice, the liver still containing the greater part of its oil, this is very palatable. The fresh livers of these fish, and also of the young coal fish and haddock, are prepared in various other ways as articles of diet, or they enter into the composition of several dishes much relished in the countries I have mentioned. I may add, that they often served me as articles of diet very many years ago; and that I now would as soon partake of them as of turtle or venison, although no lukewarm admirer of these admirable articles of diet, which, when excellent of their kind, gratify the palate, humour the stomach, and harmonise all the organic functions.

gr. iij; Camphoræ; Ammoniæ sesquicarb., āā, gr. xij.; Mucilag. Acaciæ q. s. *m.* Fiant Pilulæ xx. Capiat j. ad iij. 2dis vel 3tiis horis.

97. *b. Aconite* was first prescribed in neuralgia by Murray; but it was previously used in rheumatism. More recently it has been much employed in neuralgic affections by Jahn, Tealier, Hufeland, Turnbull, and others. Spielmann advises it to be given with the golden sulphuret of antimony; Rademacher with the decoctions of guaiacum and sassafras; Wildberg with the succinated spirit of ammonia, the galbanum plaster with opium being employed externally; and Fritze with the boracic acid. I have prescribed it with the biborate of soda. The preparations of aconite that are chiefly to be depended upon, are the alcoholic *extract*, and the *tincture*, both for *internal* and for *external* use (§ 110.), but they are most quickly efficacious when applied externally. Aconite has succeeded in several cases in my practice, but it failed very recently in a case of femoral neuralgia. It is, however, a very valuable remedy, particularly in the rheumatic forms of the complaint, and in neuralgic affections of the heart and diaphragm, as well as of the nerves of the trunk and extremities. It is not indicated in the inflammatory states of the disease; and it should not be given in these until local depletions have been resorted to. The modes of exhibiting it advised by Hufeland and Jahn deserve notice: —

No. 301. ℞ Extr. Aconiti; Calomelanos, āā, gr. ij.; Resinæ Guaiaci ʒss.; Sulphureti Antimonii Aurei gr. ij.; Olei Valerianæ Ætherei ♏ij.; Sacchari Albi ℈j. *m.* Fiat Pulvis. Capiat dimidium mane nocteque.

No. 302. ℞ Extr. Aconiti, ʒss.; Extr. Conii; Res. Guaiaci; Assafœtidæ, āā, ʒj.; Calomelanos gr. xv. *m.* Fiant Pilulæ sing. gr. iij. Capiat iij. ad vj. ter quotidie.

98. *c. Belladonna* has been very generally prescribed in neuralgia. I have given it with camphor and sulphate of quinine; and at the same time applied it externally, as about to be noticed (§ 111.). In some instances I have found it occasion stupor and malaise without materially relieving the pain. M. Trousseau has advised the extract of it, in doses of a quarter of a grain, to be given every hour until it causes vertigo, and then it is to be taken at longer intervals. He also has given it with sulphate of quinine, or with preparations of iron; or he has exhibited these after the narcotic effects of the belladonna had become manifest. Siebold, Thompson, and Deleau have recommended it to be employed both internally and externally. Pereira considers it inferior to aconite in this disorder.

99. *Stramonium* has also been extensively used in neuralgic affections. Lentin prescribed it in the form either of tincture or of extract. It has been favourably mentioned by Marcet, Trousseau, Begbie, Vaidy, Richter, and others. It is advantageously given with camphor and ipecacuanha. Dr. Rowland found it to succeed only in three cases out of ten, and in these three, partially in two, and completely in one. Dr. Elliotson considered it most useful in enteralgia.

100. *d. Conium* was strongly recommended by Fothergill for this affection. It afterwards fell into disuse; but it has since been favourably mentioned by Chaussier, Dumeril, and Rowland. The reputation of *Hyoscyamus* is probably equal to that of conium in the treatment of neuralgia. Breitung prescribed the extract of it with calomel; and Herison the tincture, with the tincture of guaiacum. It enters into the composition of the pills of Meglin, which have obtained some notoriety in this complaint: —

No. 303. ℞ Extr. Hyoscyami; Extr. Rad. Valerianæ; Oxydi Zinci, āā, ʒj. *m.* et divide massam in Pilulas lx. Capiat j. vel. ij. 2dis vel 3tiis horis.

101. *f.* The *Rhus Toxicodendron* has been advised for neuralgic affections, but it has never come into general use. Anderson gave three grains of the powdered leaves three times a day; and Goeden prescribed the resin of guaiacum, the powdered leaves of the toxicodendron, and calomel in the form of pills.

102. *g. Colchicum* has not been so generally employed in this class of affections as it deserves; and it has not proved so successful in some of the cases in which it has been prescribed as it might have been, if it had been given in those forms and combinations in which I have found it beneficial in these affections. In some persons, especially in those subject to visceral neuralgia, it is very liable to occasion remarkable depression of nervous power. It should therefore be exhibited with much caution, and in conjunction with stimulants or tonics. Accumulated fæcal matters and morbid secretions should be evacuated before it is taken. I have found it most serviceable when given with ammonia, or camphor, or with cinchona and an alkaline carbonate, — the powder of the cormus, or the extract with sulphate of quinine and camphor, or with sulphate of iron and powdered capsicum, in the form of a pill; — the tincture or wine, with the decoction, and the compound tincture of cinchona, and the sesquicarbonate of ammonia, or the carbonates of the fixed alkalies; — or any of the preparations of this plant with magnesia, and appropriate stimulants and restoratives. I prescribed, in 1820, for a lady in Walworth, suffering a most acute attack of facial neuralgia, colchicum, with the decoction and compound tincture of cinchona, the sesquicarbonate of ammonia, and the tincture of capsicum, after the bowels had been completely evacuated by means of chologogue purgatives. The removal of the attack was rapid, and the patient did not experience a return of it for some years. Some years afterwards I had recourse to the same combination for neuralgia of the muscles of the arm, in a young gentleman who had experienced a very severe epileptic seizure, for which he had been largely blooded and much reduced. It was continued during a few days, and was aided by active purgatives. The neuralgic affection ceased; but some months afterwards he was again seized with epilepsy, a physician saw him in my absence, and directed bloodletting, which was followed immediately afterwards by another attack of epilepsy and paralysis of the arm, formerly the seat of neuralgia.

103. *h. Hydrocyanic acid* is often of service, but chiefly in cases of visceral neuralgia, more particularly gastralgia and enteralgia. I have found it successful in some cases in which colchicum produced remarkable depression. It may be given with camphor, the sesquicarbonate of ammonia, or with other stimulants and restoratives, or with carminatives. When visceral neuralgia is complicated with anæmia, it may be prescribed at the same time with the salts of iron.

104. *ε.* Sialagogues and Errhines were formerly much employed in painful affections of the head and face; and in some forms and cases of

facial neuralgia they may still be employed with some hopes of benefit. When it is considered that the substances which are used locally as *errhines* or as *sialagogues* act directly upon branches of the trifacial nerves,— upon ramifications of the very nerve which is generally the seat of the affection, — the modern neglect of these means is deserving of remark.—*a*. Errhines, however, should be used with caution when there is reason to infer any serious affection of the encephalon, or active determination of blood to, or congestion in, that organ. As respects the choice of substances which may be used in this way, those which most efficiently promote a discharge from the pituitary membrane are the most efficacious. Sugar, in a fine powder with a small quantity of black pepper or capsicum intimately mixed in it; the various kinds of snuff; and powders containing a small proportion of veratrum or of asarum, may be employed, according to the circumstances of the case.

105. *b. Sialagogues* and *masticatories* may be used without any risk in all cases. Tobacco is the common local sialagogue amongst sailors, and the community of the United States of America; and is probably both a cure and preventive of facial neuralgia and toothach in many instances, particularly of the latter form of the disorder. But the continued or frequent use of this substance as a masticatory proves injurious to the digestive organs, and to the organic nervous energy, owing to the quantity of saliva imbued with the juice of it which is swallowed. When it is desirable to use any of the warmer substances as a masticatory, horse-radish, ginger, mezereon, pellitory of Spain, or capsicum, may be selected. If a tonic and antiseptic be preferred, the betel nut, catechu, myrrh, the astringent barks, &c. may be employed. If a refrigerant be indicated, camphor, alum, sal ammoniac, &c. may be used. For *toothach* several substances have been employed as masticatories or as sialagogues with advantage, and various combinations of them with narcotics, or with antiseptics, have been resorted to. Thus camphor dissolved in the tinctures of opium and capsicum, creasote being added to the solution, acts both as a sialagogue and as an anodyne in this complaint, when applied by means of a piece of lint or cotton to the gums or to a diseased tooth.

106. ζ. External Modes of Medication have been resorted to in neuralgic affections, in almost endless variety.—*A*. Of *local bloodletting* notice has already been taken, and the propriety of it vindicated in many instances and wherever a chronic state of inflammation of the nerves is inferred to be present. Various modes of employing *galvanism*, *electricity*, and, more recently, *electro-magnetism*, have been adopted by Andry, Thouret, Lebreton, Bally, Harris, and Harles. *Acupuncture* has been recommended by Recamier, Bergamaschi, Sachs, Churchill, and others, especially in sciatica. Of these means I have had no experience. The *affusion of cold water*, the *shower-bath*, and *cold salt-water bathing* have been severally advised; but they may be hurtful more frequently than beneficial, if they be not prescribed with discrimination, and if they be not immediately followed by frictions, and other means to secure reaction.

107. *B. The strictly local applications* to neuralgic parts are numerous. They may be arranged into — 1st. Those which are intended to alter the sensibility of the affected nerve, without causing vesication or suppuration; — 2d. Those which, by causing vesication or suppuration, in addition to the local excitement, may thereby more permanently impress and change the morbid affection; — 3d. Those which may still more powerfully affect the seat of disorder, by being applied more immediately to the nerves and capillaries in the vicinity, and after the cuticle has been removed; or those which admit of being *endermically* prescribed; — and 4th. Those which interrupt the communication between the seat of the affection and the sensorium; and which may remove the cause of irritation in the part affected.

108. *a. Those applications which are intended to alter the sensibility of the affected nerve, without causing vesication or suppuration* consist chiefly of compresses, epithems, cataplasms, pomades and ointments, frictions with ointments or liniments, embrocations, and plasters. — (*a*.) *Compresses* and *Epithems* of various kinds have been prescribed by Ricotti, Mondière, and others; and the chief of these are, compresses moistened with cold water, or with a solution of prussic acid, or with laurel-water. Epithems with a solution of corrosive sublimate (4 grs. to ℥j. of distilled water) have even been resorted to by Wedekind and Fleischmann. Hufeland advises compresses moistened with equal parts of laurel-water, Goulard's lotion, and rose-water, or with this last somewhat in excess. Trousseau recommends an epithem of a decoction of stramonium (℥j. of the plant to lbj. of water).

109. (*b*.) *Cataplasms* or *poultices* containing various active substances have sometimes proved beneficial. The powdered leaves of hyoscyamus, of conium, of tobacco, and of the solanum nigrum, have been made into poultices with linseed meal and decoction of poppies, and applied to the affected part. Poultices containing one or more of these, and some stimulating or irritating substance, as capsicum, mustard, &c., so as to conjoin a narcotic with an irritant or rubefacient effect, have likewise been advantageously applied.

110. (*c*.) Various *pomades* and *ointments*, with or without friction, have been recommended — those containing the extract of belladonna, or the acetate of morphia, by Lambert, Bartels, Lesieur, &c.; — those containing the iodides of mercury, by Thompson and Scott, or the iodide of potassium; — those containing the sub-carbonate of lead, by Ouvrard; — and those with veratria, aconite, &c., by Turnbull, Rowland, and others. Several of these are more serviceable when applied by friction, so as to occasion considerable rubefacient effect, as those with the iodides of mercury or of potassium, or with veratria or aconite.

111. (*d*.) *Frictions with stimulating liniments* or with strong solutions of *narcotic substances*, or with both conjoined, have been employed. Colville found frictions with tar of service; and Todd derived advantage from friction with a strong solution of extract of belladonna (ʒij. of extr. in ℥j. of water). I have had recourse to friction of the affected parts with narcotic and rubefacient substances conjoined, and frequently prescribed the following with marked benefit: —

No. 304. ℞ Linimenti Camphoræ Co.; Linim. Terebinthinæ, āā, ℥jss.; Olei Olivæ ʒijss.; Olei Cajuputi ʒjss.; Extr. Belladonnæ (vel Tinct. Alcohol. Aconiti) ʒiij. Misce, ut fiat Linimentum.

112. (*e.*) *Embrocations* with various substances have proved equally serviceable with any of the foregoing applications. Warm flannels, or several folds of cotton made warm, and thoroughly imbued with any of the *liniments* referred to in the Appendix (F. 295—314.), or with the liniment just prescribed, and then closely applied to the affected part, and covered by a warm napkin, or by oiled silk to prevent evaporation, are often of essential service in most of the varieties of neuralgia, particularly when renewed from time to time or according to the effect produced.

113. (*f.*) *Plasters* of various kinds have likewise been placed on the part, and some of them have been intended to produce a rubefacient, in addition to their other effects. Those plasters which contain *belladonna*, or both this narcotic and *camphor*, have usually been preferred. M. Trousseau has employed the extract of *stramonium* in this manner. The following plaster has been frequently applied in sciatica: —

No. 305. ℞ Ceræ Albæ ℥j.; Olei Terebinthinæ ℥ss. leni igne colliquefactis, adde Pulveris Euphorbiæ ℈j. — ʒss. *m.* Fiat Emplastrum.

114. *b. Various means of producing vesication, pustulation, or suppuration*, have been resorted to for this complaint. — (*a.*) *Blisters* applied, and even repeated, in the course of the nerve, have been praised by Cotugno, Magendie, and others. *Moxas* have likewise been recommended by Bontius, Cotugno, Larrey, Barras and Walther. Compresses moistened with a strong solution of tartarized ointment, and applied until redness or pustulation is produced, has been prescribed by Magri; but an ointment containing the tartar-emetic, or mercurial ointment with it (ʒj. of ant. tart. and ℥j. of the oint.) as used by Scott, is more immediate and certain in its effects than the solution. *Issues* and *setons* have been employed in the more obstinate or chronic cases. For sciatica they may be placed near the trochanter major, and, in cases of facial or occipital neuralgia, particularly when there is reason to dread organic lesion near the base of the cerebrum or cranium, they may be inserted in the nape of the neck, or somewhat higher, or even in the occipital scalp.

115. *c. Applications to the affected part after the cuticle has been removed from the surface*, — or *endermic medication*, as it has been termed, — have been frequently tried in neuralgia, and recommended by Trousseau, Ricotti, Bonnet, Ansiaux, Radius, and others. Various narcotic substances have been thus employed; but the acetate of morphia, sprinkled over the surface thus denuded of its cuticle, or ten grains of the acetate intimately mixed in from one to two drachms of an ointment, a portion of this being applied to it, and an ointment with a small portion of the extract of belladonna, are the means most frequently selected, although various other substances may be similarly applied.

116. *d.* The *affected nerve* in some instances *has been divided* above the seat of pain, in order to interrupt the communication between the seat and the sensorium; but there are very few cases on record, in which this measure has succeeded beyond a short period, or given permanent relief. When there is reason to infer the existence of any irritating substance in the nerve or part affected, the removal of it, if this be at all possible, should be attempted; and, when the affection seems to proceed from the exposure of a fibrile of nerve in a cicatrix, or from the irritation of an eruption, the application of a caustic to the former, suppuration being afterwards promoted, and of appropriate means to the latter, according to its nature, is chiefly indicated.

117. *C.* The *diet and regimen* for neuralgic patients must necessarily depend upon the peculiarities, causes, and complications of individual cases. In most instances, however, regular and abstemious living; due exercise in the open air; the avoidance of all depressing physical and mental causes; and a pure, dry, and moderately warm air, avoiding all injurious exposures, night air, dews, and crowded assemblies, are most conducive to recovery, and to the prevention of those recurrences of the complaint, to which all are subject who have once been tormented by it. Above all, the predisposing and exciting *causes* (§ 52. *et seq.*) should be guarded against; the stomach preserved in good humour; and all the secretions and excretions healthily promoted, without being inordinately increased — or increased so as to occasion debility. In some instances, a course of *chalybeate* or *alkaline mineral waters* proves of service, after appropriate medical treatment has ceased; and when the complaint has been caused by malaria, cold, and other physical influences, these are often extremely beneficial, when the state of the digestive organs receives due attention.

Bibliog. and Refer. — *Aretæus*, De Morb. Diuturn. lib. i. cap. ii. edit. *Boerhaave*.—*Degener*, in Act. Nat. Cur. t. i. — *André*, Observ. Prat. sur les Malad. de Urethre, 8vo. Paris, 1756. — *Cotugno*, De Ischiade Nervosa, 1770. — *Thouret*, Hist. de la Société de Médicine, t. ii. iv. — *Fothergill*, Med. Observat. and Enquiries, vol. iii. — *I. C. Tode*, in Soc. Med. Hann. Coll. t. i. — *Van Swieten*, Commen. in Aphorism. *Boerhaavii*, t. ii. sect. 757. — *Murray*, Apparat. Medicam., vol. iii. p. 17. (*Aconite.*)— *A. Pujol*, Essai sur la Maladie de la Face nommé le Tic Douloureux, 12mo. Paris, 1787. — *C. C. Siebold*, Doloris Faciei Observationibus illustrati Adumbratio, 4to. Wirceb. 1795. — *J. Girault*, Mém. sur la Guérison d'une Sciatique Universelle, 12mo. Bruns. 1800. — *P. R. Baily*, Essai sur la Neural. Femora-Popliteé, 4to. Paris, 1803. — *J. P. Hamel*, de la Neuralg. Fac. in Journ. Gén. de Méd. t. xvii.—*F. Chaussier*, Table Synoptique de Neuralgies, fol. Paris, 1801.—*S. Fothergill*, A Concise Account of Tic Douloureux, 12mo. Lond. 1804. — *Langenbech*, De Nervis Cerebri in Dolore Faciei Consideratio, 4to. Goett. 1805. — *Corkindale*, Edin. Med. and Surg. Journ. vol. iv. p. 306. — *Barras*, Biblioth. Méd. Dec. 1813. — *Pinel*, Nosographie Philosophique, t. iii. cl. iv. ord. 3. —*A. Portal*, Anat. Médicale, t. iv. p. 142. — *J. P. Puzin*, Observ. sur quelques Faits rares et sur les Neuralgies, 4to. Paris, 1809. — *J. L. Duval*, Sur quelques Affec. Douleureuses de la Face, 8vo. Paris, 1814. — *Bostock*, Amer. Med. and Phil. Recorder, New York, 1814. — *Colville*, Edin. Med. and Surg. Journ. vol. x. p. 288. — *D. Pring*, A View of the Relations of the New Syst. in Health and Dis. 8vo. Lond. 1815. p. 111. — *Murray*, An Essay on Neuralgia, New York, 1816. — *M. Meglin*, Récherches sur la Neuralgie Faciale, 8vo. Strasb. 1816. — *Marcet*, Med. and Chirurg. Trans. of Lond. vii. p. 552. — *Vaidy*, in Journ. Complement du Dict. des Sc. Méd. t. iii. p. 180. —*J. Bailey*, Observat. on the Use of Belladonna in painful Disorders. 8vo. Lond. 1818. — *C. F. Bellingeri*, De Nervis et Neuralgia Faciei, 8vo. Turin, 1818. — *J. Kirby*, Cases with Observat. of Wry Neck, &c. 8vo. Lond. 1819. — *B. Hutchinson*, Cases of Tic Douloureux successfully treated. 8vo. Lond. 1820. — *Todd*, in Transact. of Associat. Apothecaries and Surg. Apoth. of England and Wales, 8vo. Lond. 1823. p. 183. —*Kerrison*, Lond. Med. Repository, 1819.— *Magri*, Lond. Med. and Phys. Journ. May, 1820. — *Henry*, in ibid. 1825. — *Thompson*, Lond. Med. Rep. July, 1822. — *R. Evans*, in Edin. Med. and Surg. Journ. vol. xxi. p. 278. — *Wilson*, in ibid. vol. xix. p. 208. — *Schmidtmann*, Observ. Med. t. iii. p. 149—182. — *Van de Keer*, in Journ. Univers. des Sc. Med. t. xxv. p. 64. — *Reveillé-Pariset*, in Archiv. Génér. de Méd. Dec. 1825. — *Lasserre*, in Journ. Univers. des Sc. Med. no. 64. art. 14. — *Bonnet*, Bullet. Génér. de Therap. t. v. p. 191. — *J. Frank*, Praxeos Med. Univers. Præcepta, p. ii. vol. i. sect. ii.

cap. 6.—*Martinet*, Revue Med. t. i. p. 86. 1824. — Ibid. t. iv. p. 329. — Ibid. t. ii. p. 52. 1834.—*Bergamaschi*, Annali Univer. de Med. 1826. —*Bayle*, Bibl. de Thérap. t. ii. p. 280. — *Wolff*, in Journ. des Progres des Sc. Méd. t. iii. p. 237. —*Stokes*, Amer. Journ. of Med. Sc. no. xxxiv. p. 496. —*Nicod*, Nouv. Journ. de Méd. t. iii. p. 247. Ann. 1818. (*On Thoracic or Intercostal Neuralgia.*) — *Wardrop*, in Trans. of Med. and Chirurg. Society, vol. viii. p. 246. — *Marcet*, in ibid. vol. viii. p. 551. — *Elliotson*, in ibid. vol. xiii. — *Yeats*, Hist. of severe Case of Neuralg. 8vo. Lond. 1822. — *L. Martinet*, Mém. sur l'Emploi de l'Huile de Terebinth. dans la Sciatique, 8vo. Paris, 1823. — *Ribes*, Observ. de Neuralg. du Nerf Facial.—*Magendie's* Journ. de Physiol. t. ii. p. 219. — *Author*, in Lond. Med. and Physical Journ. vol. xlvi. p. 193. ; and Lond. Med. Repos. vol. xvii. p. 374. — *Montfalcon*, Dict. des Sc. Méd. t. xxxv. p. 500. — *Andral*, Clinique Médicale, t. ii. and t. v. ; and Précis d'Anatomie Pathologique, t. ii. — *C. Bew*, Opinions on the Causes and Effects of Tic Douloureux, 8vo. Lond. 1824. — *M. Duparque*, in Nouv. Biblioth. Méd. t. iii. 1826. — *P. Jolly*, in Ibid. t. i. et t. ii. ; et Dict. de Med. et. Chirurg. Prat. art. *Neuralgie*. — *Abercrombie*, Pract. and Pathol. Researches on Dis. of the Brain and Spinal Cord. 8vo. p. 324. — *T. Tyrrell*, in his edit. of *A. Cooper's* Lectures on Surgery, vol. ii. p. 407. — *C. Scudamore*, A Treatise on Rheumatism and Neuralgia, 8vo. Lond. 1827. — *Brown*, in Glasgow Med. Journ. 1828. — *Campaignac*, Sur les Neuralg. des Organs Génito-Urinaires et de l' Anus, in Journ. Hebdom. de Méd. t. ii. p. 396. Ann. 1829. — *Bardsley*, Hospital Reports, 8vo. Lond. 1830, p. 101. — *T. P. Teale*, A Treatise on Neuralgic Diseases, &c. 8vo. Lond. 1829. — *Rev.* in *Johnson's* Med. and Chirurg. Rev. no. xxiii. p. 112. — *G. Strombio*. Giorn. Analitico di Med. Milano, Settemb. 1828. — *Barras*, Traité sur les Gastralgies et les Enteralgies, 8vo. Paris, 1829 ; 2d edit. 2 tomes. — *J. Macculloch*, An Essay on Remittent and Intermittent Diseases, including generally Marsh Fever and Neuralgia, &c., and treating of Tic Douloureux, Sciatica, Headach, Ophthalmia, Toothach, Palsy, &c. 2 vols. 8vo. Lond. 1828, vol. ii. — *Dupuy*, Rev. Med. t. i. 1829. — *Gardner*, Lond. Med. and Phys. Journ. 1830. — *Halliday*, Consid. Prat. sur les Neuralgies de la Face. 8vo. Paris, 1832. — *Herison*, Journ. de Pharm. et des Sc. Access. Mars. 1832. — *Tott*, Archiv. Gén. de Méd. Juill. 1832. — *P. A. Piorry*, Clinique Méd. de la Hôp. de la Pitié. p. 293. Paris, 1833. — *Deleau*, Mém. sur l'Emploi des Cataplasmes de Belladonne dans les Neuralgies, 8vo. Paris, 1833. — *Elliotson*, in Cyclop. of Pract. Med. vol. iii. p. 165. — *H. Halford*, Essays and Orations, read and delivered at the Roy. Coll. of Physicians, p. 34. 3d edit. 8vo. Lond. — *J. Scott*, Cases of Tic Douloureux. 8vo. Lond. 1834. — *J. Swan*, A Treat. on Dis. and Injuries of the Nerves, p. 1. 2d edit. 8vo. Lond. 1834. — *Thompson*, Cases of Tic Doul. and other Forms of Neuralg. 8vo. Lond. 1834. — *Bellingeri*, Annal. Univers. di Med. Avril. 1834. — *Ricotti*, in ibid. Juill. 1829. — *Biett*, in Dict. de Med. t. viii. p. 15. 2d edit. — *Harris*, American Journ. of Med. Sci. August, 1834. — *Roots*, in Lond. Med. and Surg. Journ. 1834. — *Bennet*, North American Archives of Med. and Surg. April, 1835. — *Osborne*, in Dublin Journ. of Med. Sciences, p. 254. Nov. 1837 ; and in Brit. and For. Med. Review, p. 276. Jan. 1838. — *C. Bell*, in Medical Gazette, Lond. 1825. — *A. Cooper*, On Dis. of the Breast, p. 76. 4to. Lond. ; and on Anat. and Diseases of the Testis, p. 110. 4to. Lond. 1841. — *Trousseau* et *Pideaux*, Traité de Therap. &c. t. i. 8vo. Paris, 1836. — *Most*, Encyklop. Wörtub. t. ii. p. 142. — *R. Rowland*, A Treatise on Neuralgia, 8vo. Lond. 1838. — *Theophilus Thomson*, in Library of Medicine, vol. ii. p. 262. — *Valleix*, De la Neuralg. Dorsale, ou Intercost. in Archives Génér. de Méd. t. vii. 3d series, 1840. — *Ollivier*, Dict. de Méd. 2d edit. art. *Neuralgie;* et Traité des Maladies de la Moelle Epinière, &c. t. ii. p. 209. 3d edit. *R. H. Allnutt*, Tic Douloureux, or Neuralgia Facialis, and other Nervous Affections, their Seat, Nature, and Cause, with Cases, &c. 8vo. Lond. 1841. (See also BIBLIOG. AND REFER. to art. NERVES.)

NIGHT-BLINDNESS AND DAY-BLINDNESS. — *Nyctalopia* and *Hemeralopia*. —

SYN. — NYCTALOPIA, νυκταλωπια (from νυξ, night, and ωψ), Hippocrates, Galen. *Nyctolopia*, Pliny, Linnæus, Vogel. *Visus diurnus*, Boerhaave. *Amblyopia crepuscularis*, Sauvages. *Paropsis noctifuga*, Good. *Dysopia tenebrarum*, Cullen. *Aveuglément de nuit, vue de jour*, Fr. *Nachtblindheit*, Germ. *Cecita di Notte*, Ital. *Night-blindness*, *Day-sight*, *Hen-blindness*, Guthrie.

HEMERALOPIA (from ἡμερα, day, and ωψ, eye). *Amblyopia meridiana*, Sauvages. *Visus nocturnus*, Boerhaave. *Photophobia*, Plenck. *Dysopia luminis*, Cullen. *Visus acrior*, Darwin. *Paropsis lucifuga*, Good. *Oxyopia*, *Luscitio*, Auct. *Homeralopie, vue de nuit*, Fr. *Tagblindheit*, Germ. *Cecita di giorno*, Ital. *Day-blindness*. *Night-sight*.

CLASSIF. — IV. CLASS. I. ORDER (*Cullen*).—IV. CLASS. II. ORDER (*Good*). —I. CLASS. III. ORDER (*Author*).

1. DEFIN. — *Obscuration or loss of vision by night only* (Nyctalopia) ; *or by day only* (Hemeralopia).

2. It has been justly remarked by Dr. FORBES, that the two terms, *nyctalopia* and *hemeralopia*, have been inextricably confused, by being taken respectively by different authors to mean the same thing ; one terming night-blindness, *nyctalopia*, and another *hemeralopia*, while day-blindness has been equally designated by both terms. He has, therefore, assigned the meaning which he would attach to each of them, and conformably with what appears to him, and not unreasonably, as their derivation, he defines nyctalopia to be vision obscured by day but good at night, and hemeralopia to be vision obscured by night and distinct by day. These meanings are opposed to those which I have assigned to the terms in question, and which are those most generally received ; the " a " in the middle of each of the words being manifestly viewed as privative.

3. Of the two disorders of vision about to be noticed, *night-blindness* is the most frequently observed, and the most generally functional. *Day-blindness*, when at all marked, is symptomatic of vascular irritation, or inflammatory action in the more interior or posterior textures of the eye. Still, in its slighter states, it may depend upon similar pathological causes to those which occasion night-blindness, but cases of this kind are extremely rare.

4. i. PHENOMENA.—In persons suffering under this complaint, vision becomes gradually indistinct as the light of day disappears, until it is entirely suspended. The blindness continues during the night, and ceases with the return of day-light ; but its degree varies in different cases, and in the same case with the duration of the disorder. At first, or in slight cases, the blindness is partial, and objects may be seen with a strong artificial light ; but as the complaint advances, vision becomes so impaired that the moon or stars cannot be discerned, nor even the light of a candle placed at a short distance : more frequently, however, an artificial light may be discerned, but not the bodies in its vicinity. In the more prolonged cases, blindness is sometimes so complete, that an object cannot be seen after sunset in the brightest artificial light. Generally the sight is restored as day-light returns, and it again becomes perfect when the sun has arisen above the horizon ; blindness and vision continue in this to correspond with the setting and rising of the sun. The approach and remission of the paroxysms at sunset and sunrise are generally gradual, but, in some cases, more or less sudden. If the disease be allowed to continue, the eyes may ultimately become so weak during day-light, that the direct or reflected rays of the sun cannot be endured without much uneasiness and indistinctness of vision ; a certain degree of *hemeralopia* thus following obstinate or

prolonged *nyctalopia*. In some, also, of these severe cases, and even when this irritable state of the eye has not been induced, the patient is incapable, when placed in an obscure situation, of distinguishing objects by day as by night.

5. Usually no uneasy sensation or visible alteration of the eye is present. The state of the pupil is variously described by authors. Some say that it is immoveable and contracted, others that it is dilated. This discordancy probably arises from the pupil having been observed at different stages of the complaint or at different periods — at night or during day only. Mr. BAMPFIELD is not always consistent with himself, when noticing this symptom. He states that, after the disorder is far advanced, the pupil is often contracted, and the patient evinces painful irritation of the eyes, when exposed to a vivid light or when looking upwards; and that it is considerably dilated both by day and night, in the proportion of about one case in twelve; and at night it is often dilated, and neither contracts nor dilates, when exposed to the moon or to artificial light. My own recollections of the few cases which I had an opportunity of seeing many years ago admit not of my offering any remark on this point: but they are sufficient to confirm my belief, that, although the complaint is in some respects local — is dependent upon the state of the nervous apparatus of the eye in part — yet this local disorder itself depends upon more general or constitutional derangement; and this must especially be the case when the nervous systems and digestive organs are particularly affected, as observed in many cases of this affection. Indeed, very few cases will be found, in which the functions of these systems and organs are not more or less impaired. That the brain is somewhat affected in some instances, is evinced by headach or vertigo, which may, however, equally with the nyctalopia, be symptomatic of impaired organic nervous energy and disorder of the digestive organs. The complaint *continues* for a very various period. It sometimes disappears without the aid of medicine. In temperate climates, it generally assumes a milder form than in hot countries. In the former it usually continues from one month to six or seven weeks. In the latter, it is often prolonged to four, six, or nine months, and even much above that period in some instances.

6. ii. CAUSES. — Nyctalopia is very rarely seen in this country; but in the most southern parts of Europe, and in countries within the tropics, it is not infrequently met with. It is said to be *endemic* in some places within the tropics; and even in some parts of the south of Europe, and of China: it has occasionally also assumed an *epidemic* form even in temperate climates, and in northern countries, where the sun in summer is long above the horizon. Thus, Dr. GUTHRIE observed it very prevalent in the Russian troops in Finland, during the spring, owing to the short absence of the sun, and the strong reflection from the snow. M. RICHERAND states, that nyctolopia is both endemic and epidemic in northern regions from the same causes; and that artisans who exert their sight in an intense artificial light, are occasionally affected with it. Within the tropics, the influence of season in producing this complaint is not so evident as in very cold climates. Dr. J. GRANT remarks that nyctalopia is not infrequent in soldiers and seamen in the East and West Indies; and that on the eastern shores of the Mediterranean, and in the islands of the Adriatic, it is at times very prevalent. It has also sometimes become epidemic in parts of France, Germany, Poland, and Europe. Wherever it occurs, it preserves the same characters, varying only in the severity of its attack and length of its duration, in individual cases, according to the constitution of the patient and the intensity and combination of the causes.

7. Nyctalopia seems to have been congenital in rare instances, according to HALLER and others, or at least to have appeared at a very early age, and to have continued subsequently. It has occurred in three persons in one family; and it has been said to be hereditary in some cases. Europeans residing within the tropics are more liable to it than the native inhabitants; and those who have been attacked are prone to a return of it, if they remain in the same climate. It is very rarely observed in children; and it is more frequent in males than in females. The colour or appearance of the eyes has no influence in favouring its occurrence. It rarely affects the upper classes, but is most frequent in those exposed to fatigue, watching, and debilitating influences, and whose diet is poor or unwholesome. Venereal excesses and manustupratio are also influential causes of it. Nyctalopia has been ascribed also to sleeping in the sun, to poisonous vegetables, and to the use of bread in which darnel is present. The ancients believed the *lolium* to be hurtful to the sight; and the observations and experiments of modern physicians have proved this opinion to be correct. It is not improbable that the *Cannabis Indica*, or Indian hemp, which is so much used in the East for the purposes of excitement and intoxication, has also considerable influence in producing this disease. Its probable dependence in some degree upon exhaustion of nervous power and weakness of the digestive functions, has already been noticed (§ 5.).

8. iii. PATHOLOGICAL STATES. — In most instances, this affection depends upon the over-excitement, and consequent exhaustion, of the nerves of the eye by the brilliant sunshine and light, in warm and arid countries, and in snowy regions, when the light of day is of long continuance, the retina and nerves being thereby reduced to a state incapable of being excited by the feeble light remaining after sunset, and of perceiving objects in that light. In the more extreme cases, the torpor of the retina and nerves seems to be so great as not to be overcome by even a bright artificial light. It is possible also, that the rays of the sun combine with them so much of electro-motive agency as to favour distinct vision, and an artificial light, not possessing this property, is accordingly less influential than they in exciting vision. The same causes, which exhaust the sensibility of the nervous apparatus of the eye, at the same time tend, particularly when energetic and prolonged, to occasion a congested, or a sub-inflammatory, state of the retina, and posterior parts of the organ, and the attendant contraction of the pupil. It is manifest also that all the circumstances which produce exhaustion of nervous energy, particularly many of the remote causes above enumerated, or congestion of the venous circulation, or both nervous exhaustion and vascular congestion, will also favour the develop-

ment of nyctalopia when its more efficient exciting causes are in operation. The connection between impairment of the digestive functions and this affection so very generally observed, is a necessary result of exhaustion of nervous power; for, when the organic nervous energy is much reduced, the functions of sense are readily exhausted and are soon proportionately weakened.

9. iv. THE PROGNOSIS of nyctalopia is generally favourable. As it occurs in temperate or northern climates, it very frequently undergoes a spontaneous cure with change of the season and circumstances in which it originated. Dr. I. GRANT states, that it has occasionally been removed by the occurrence of diarrhœa, of hæmorrhage from the nose, and of abscesses and eruptions about the head and face. I met with a case many years ago which was removed almost immediately by copious discharges of morbid bile consequent upon the exhibition of stomachic purgatives, the inordinate accumulation of bile in the gall bladder and biliary ducts having been intimately connected with the development of this affection. BONTIUS, SENNERTUS, ETTMULLER, BOERHAAVE, and some authors, however, have formed a much more unfavourable opinion of the complaint than that just now expressed; and as it appears in warm climates, particularly when affecting persons addicted to intoxicating liquors, to the use of opium, or of the cannabis indica, nyctalopia is much more difficult to remove, than in other circumstances, and sometimes long resists treatment. Much, however, depends upon the existing states of the nervous system generally, and of the digestive organs, upon the habits of the patient, and upon the continuance or interruption of the exciting causes. In these more unfavourable circumstances, total loss of sight may ensue, as remarked by BAMPFIELD and others; but this result rarely occurs unless internal inflammation of the eye supervenes, or is neglected.

10. v. TREATMENT.—The humoral pathologists, believing that nyctalopia depended upon inspissation and congestion of the humours, had recourse to *bleeding*, *attenuants*, and *deobstruents*, with *purgatives*, *sternutatories*, and *sialogogues*, and as these often removed fæcal accumulations and morbid secretions from the *primæ viæ* and collatitious viscera, advantage frequently resulted from this treatment. In some instances an *emetic* was premised with benefit. The exciting substances, by which the senses of smell and taste were thus roused, sometimes tended, by nervous connections, to remove the torpor of the nerves of the eye. Both the ancients and the moderns, in places the most remote from each other, have had recourse to the livers of various animals — of bullocks, he-goats, sheep, pigeons, black-cocks, black swine, &c.—for the cure of nyctalopia; these being eaten as an article of diet, or the vapour from them being used as a fumigation for the eyes. Dr. I. GRANT states, that he has repeatedly seen a cure apparently produced by fumigating the eyes with the vapour of bullock's liver. The disease occurred in persons who were in some degree affected with scurvy; and various measures had previously been resorted to without benefit; two or three fumigations having cured the complaint. The same writer remarks, that the vapour from the heated liver was applied to the eyes; at other times the viscus itself was given to the patient to eat; in both cases, after it had undergone the most complicated preparations, particularly with various stimulating substances. A recent German writer, Dr. MEISSNER, gives a similar account to the above, of the *liver-cure* of nyctalopia. He states, that, in a small town of Podolia, he met with more than a hundred cases of the complaint. It was then the time of the Greek fast, when the inhabitants use no animal food, but live chiefly on bread and grits prepared with oil. He was assured, that, at the same period every year, a great many people are seized with nyctalopia; but that when Easter came they ate the liver of a black-cock, or black swine, and were cured in a few days. He examined, by day and by night, several of those affected by the disorder, but could perceive nothing particular in their eyes, except great immobility of the pupils. In other respects, they were in perfect health; and would submit to no other treatment, assuring him that they should be free from their malady within fourteen days without any medicines. On Easter day they began to eat liver and animal food, and two of those he had examined saw as well as ever on the third day, and on the following Sunday all were completely cured. In these cases, the application of the heated vapour; the aroma and vapour from various stimulating substances added to the liver; the use of a much more exciting diet, after a protracted fast, which had been more or less influential in producing the affection; the influence of the imagination, and still more probably, the fact of the chief causes of the complaint having ceased to be in operation, serve to explain the effect, without imputing any particular virtue to the particular viscus in question.

11. It is very obvious, that this complaint should be treated upon rational principles, and if the application of these to each case fail in any one, these empirical means may be resorted to, according to the weight of evidence which may exist in its favour. The *first intention* of the physician should be to ascertain the predisposing and exciting causes, and to remove them: — the *second*, to observe the exact states of the eye, and of the head, particularly with reference to the presence of congestion, or of an increased or diminished determination of blood to the brain, eyes, &c., and to prescribe means appropriate to whichever of these states that may be present: — and the *third*, should be to determine the modes in which the several digestive, assimilating, and excreting functions are being performed.

12. The *first* of these requires no remark; but the *second* demands most careful observation of each case, and involves very different, if not opposite, modes of cure, according to the results which each case furnishes to such observation. If vascular plethora, or active congestion of, or determination of blood to, the brain, be present, then depletions, according to the peculiarities of the case, are requisite. If, on the other hand, the vascular system indicate insufficiency of blood, and the state of the head a diminished flow of blood to the brain, a nourishing diet, chalybeate medicines, and tonics, with due attention to the several digestive functions, are thereby indicated. Emetics, stomachic and deobstruent purgatives, alternated with vegetable bitters and tonics: the sulphate of quinine or of iron with camphor: the infusion or decoction, and the compound tincture of cinchona,

are generally beneficial, when employed appropriately to the indications furnished by each case, and ought not to be omitted, even although the indications of internal disorder may be slight. Due regard should be had to the state of nervous power both generally and locally; and whilst torpor of the nerves of the organ should be attacked by the application of stimulants and irritants to the vicinity of the eye, or even to the eye itself, exhaustion of nervous power should be removed by means of the more permanent and diffusive restoratives just mentioned, or by others of a similar nature. With this intention the extract of *nux vomica* or *strychnine*, or the tincture or spirituous extract of *aconite*, may also be severally but cautiously prescribed, either singly or conjoined with vegetable bitters and tonics, or with stomachic aperients.

13. Of the *local means*, blisters applied to the temples, and renewed according to their effects, as advised by Mr. Bampfield, are amongst the most efficacious; but other local stimulants may be prescribed, more particularly the warm vapour of camphor, or of ammonia; embrocations or liniments with ammonia, camphor, tincture of capsicum, are applied on the temples, and warm collyria to the eyes themselves. Besides these, electricity and galvanism have been resorted to, and with more or less benefit. It is not improbable, that an ointment containing either of the most irritant of the narcotic vegetable alkaloids, particularly veratria, strychnine, aconitina, &c., may be of service, when applied to the temples, and the effects carefully watched. Errhines and sialagogues may also be tried.

14. II. Hemeralopia according to the meaning which I have attached to the word (§ 1.), namely, *day-blindness or imperfect vision in the day, particularly in sunshine, and more perfect or natural vision in the twilight*, is rarely observed, even in connection with night-blindness, unless the latter has gone on to inflammation of the inner coats of the eye, or is associated with inflammatory action in the brain, or with incipient opacity in the crystalline lens, or with other diseases of the eye; of which affections some degree of day-blindness is often symptomatic. Indeed, whenever the sensibility of the retina is naturally acute, as in Albinos (probably owing in them to the deficiency of dark colouring matter in this part), or is morbidly increased, owing to disease of more or less intimately related structures, particularly to inflammatory states of the brain, or of its membranes, or to the more temporary excitement consequent upon an excessive use of spirituous or other intoxicating liquors, then more or less of hemeralopia is often complained of, especially in the light of the sun, or in any other strong light. Hemeralopia, like nyctalopia, may be symptomatic also of intestinal worms and even of hysteria. In these circumstances, it may be viewed as a consequence chiefly of a morbid sensibility of the retina and nerves of the eye, and generally independent of inflammatory action.

15. i. *The treatment* of day-blindness must necessarily depend upon the state of disease of which it is symptomatic. If it proceed from inflammatory action, vascular depletions, and the antiphlogistic treatment, cold shower-baths, purgatives, diaphoretics, and sedatives, are generally required, aided by cooling and anodyne collyria. If it proceed from morbidly increased sensibility unconnected with inflammatory irritation, an opposite treatment, as tonics, chalybeates, and restoratives with antispasmodics, anodynes, and anthelmintics are required, with change of air and attention to diet and regimen.

Bibliog. and Refer. — *Hippocrates*, De Morb. Vulg. l. vi. sect. 7. — *Plautus*, Miles Gloriosus, act. ii. sc. iii. v. 50. — *Celsus*, l. vi. c. 6. — *C. Plinii Secund.* Nat. Hist. l. xxiii. 63. l. xxviii. 47. l. xxix. 38. (*Treated by the liver and blood of goats, the ashes from the dung of fowls, &c.*) —*Avicenna*, Canon. l. iii. fen. iii. tract. iv. cap. 3. p. 561. — *F. Plater*, Praxis Med. t. i. cap. 6. p. 193. — *Forestus*, Opera Omnia, l. xi. obs. 38. Franc. 1634. — *D. Sennert*, Opera, t. iii. l. i. p. iii. sect. ii. c. 44. p. 256. — *Bontius*, De Medic. Indor. l. iv. p. 32. — *Ettmuller*, Opera Omnia, l. ii. art. i. p. 33. ed. Lond. 1701.— *Boerhaave*, De Morb. Oculor. 8vo. s. 158. Got. 1750.—*Haller*, Disput. tom. i. disp. xxii. sect. 2. Laus. 1750. — *Chamseru*, Hist. et Mem. de la Soc. Roy. de Méd. Ann. 1780.— *Flemming*, in *Hufeland*, Journ. der Pr. Heilk. June 1810. p. 73. — *Bampfield*, in Trans. of Med. and Chirurg. Soc. vol. v. p. 39. — *Guthrie*, in Edin. Med. Comment. vol. xix. p. 288. — *Scarpa*, Malatie degli Occhi, p. 252. Pavia, 1801. — *Forbes*, Edin. Med. and Surg. Journ. vol. vii. p. 419. — *Richerand*, Elements of Physiology, by *J. Copland*, 8vo. p. 650. Lond. 1829. — *Demours*, Dict. des Sc. Médicales, t. xxxvi. p. 549. — *Radii*, Scriptor. Ophthalm. Minor. vol. iii. p. 176—193. Lips. 1830. — *E. Meissner*, Bemerk. aus dem Taschenbuche eines Arzes, &c. Halle, 1819; and Encylopädisches Wörterbuch, &c. b. v. p. 388. 8vo. Berl. 1830. — *A. Simpson*, Observations on Hemeralopia or Nocturnal Blindness, 8vo. Glasg. 1829. — *Raige Delorme*, in Dict. de Méd. 2d edit. arts. *Héméralopie et Nyctolopie.* — *I. Grant*, in Cyclop. of Pract. Med. vol. iii. p. 184.

NOLI ME TANGERE.—See Lupus.

NOSTALGIA.—Synon. *Nostalgia* (from *νοστος*, a return home, and *αλγος*, sorrow), Sauvages, Cullen, and others. *Nostrassia*, *Nostomania*, Auct. var. *Pathopatridalgia*, Zwingler. *Philopatridomania*, Harder. *Maladie du Pays*, *Nostalgie*, Fr. *Das Heimweh*, Germ. *Malattia del paese*, Ital. *Mother-sickness*, *Home-sickness*; *a morbid longing for home.*

Classif. — General Pathology — Ætiology — Special Pathology.

1. Nostalgia is rather *a cause* of disease than a *disease* in itself. It has, however, been described by several writers as a form of *melancholia*, from which, however, it is quite distinct. I shall briefly consider it *firstly*, as a cause of disease; and *secondly*, as a disease superinducing still more serious disease.

2. I. Ætiology.—If we associate the suggestions or memory of our native home or place with those of many of the attendant occurrences, and the moral emotions and affections of which home has been the scene, what numerous sources of misery or of happiness are often thereby called into existence, more especially if they be made subjects of contemplation or of mental rumination in different, opposite, or less happy circumstances than when they made their first impression on the mind. How frequently is the early happiness of life made the means of heightening present wretchedness, especially by the uncultivated and ill-regulated mind; or by the mind that is unable to repose upon other and more fortifying resources. The suggestions of memory, in continually haunting the mind of him who has removed, for the first time, from the scenes of varied enjoyments and strong excitements, to places remote, not only from these but from all other attachments, particularly if he be doomed to different avocations from those to which he had become accustomed, are amongst the most distressing of the numerous ills that embitter the

destiny of man. They are less, or perhaps but little, felt by him who becomes a voluntary exile in pursuit of gain: but even he has his melancholy reminiscences, "when he would not if he could be gay;" especially after the exciting delusions of hope have lost a portion of their witching influence; and he, at times, with the compelled exile, experiences those emotions which the scenes of early life and of early attachments suggest. The person who leaves his native abode, particularly if it be endeared to him by simple joys and warm affections — if it possess scenery of wild sublimity, or seas of stormy grandeur — if he have been accustomed to gaze upon the one, whilst borne furiously along upon the other — if he have repeatedly escaped from the imminent dangers of either, in order again to experience the exciting pleasures they afford — however far, or in whatever manner removed from such scenes and such enjoyments, he constantly reverts to them, not only in his waking, but also in his sleeping, hours. Visions of former bliss or of former dangers haunt him by night and by day. His sleep is broken or disturbed; his appetite fails him; his healthy looks vanish; and a gradual blight overtakes him. In this manner persons have been known to wither gradually, sometimes without any organ evincing disease of a prominent kind; whilst more frequently some particular part, owing to various concurring causes, experiences dangerous disease, to which this maladie du pays has predisposed, and rendered almost or altogether irremediable. Numerous examples of the effects of continued longing for the scenes of early life occur to the medical practitioner; but they are most common amongst the natives of the high lands, as those of Switzerland and of Scotland, when they migrate to the low countries, where this feeling is heightened by the influence of a more depressing air upon constitutions formed in the pure and cold atmosphere of more elevated regions. Nor are the natives of richer and more fertile countries, and those abounding in peaceful occupations, without an inward pining after the scenes of early enjoyments and tender associations, when removed at a distance from them. Indeed, suggestions of these haunt the minds of the expatriated — whether the willing or the compelled — and, with an attraction of indescribable sweetness, will not allow us to forget our native soil.

> "Nescio qua natale solum dulcedine captos
> Ducit, et immemores non sinit esse sui."

3. Nostalgia is most frequent amongst those who have removed at an early age from the endearments of near and affectionate relatives, and from the simple pleasures of a country life; more especially when disappointment, fatigue, privations, and sickness overtake them soon after their removal. It is common amongst young soldiers and sailors who are subjected to privations and fatigue in foreign climates, particularly if these climates be unwholesome. The endemic influence of these climates, by depressing the vital energies, both favours and increases this desire of return to the place of nativity. CAMPBELL has beautifully illustrated this feeling in the "Soldier's Dream," whilst sleeping on the field of battle, in which the joys and endearments of home appear to him, and sorrow returns to him with waking consciousness. Home-sickness is also frequent amongst young persons of both sexes, who have been unaccustomed to painful impressions, when they remove to large cities, and are subjected to the confinement or rigorous duties of servitude. It is rare amongst persons advanced in years, and particularly amongst those who have experienced the frowns or vicissitudes of fortune. Nostalgia, although more correctly a cause of disease than a disorder of itself, still may be viewed in the latter sense, — as a disorder consisting at first of a morbid exaltation of those instinctive and moral feelings, in which recollections of home and of tender attachments are associated with sentiments of regret at the loss of the endearments which those attachments afforded. These feelings, when inordinately exerted or long indulged, depress, or even further disorder the digestive, assimilating, and circulating functions, through the medium of the organic nervous system, until ultimately disease of the organs performing these functions, or of the brain itself, according to their individual predisposition, is produced.

II. NOSTALGIA, — *Nostomania*, — *Nostrassia*, — *Home-sickness.*

CLASSIF. — I. CLASS. IV. ORDER (*Author*).

4. DEFIN. — *The desire of returning to one's native country immoderately or morbidly indulged, or recollections of home and its endearments made the subject of unavailing regret, to the neglect of other considerations and objects, and to the injury of health.*

5. *A. Symptoms.* — The earliest signs of nostalgia are unusual reserve, sadness, distaste of amusement and of occupation, a continual recurrence to the various circumstances connected with home, and expression of regret at removal, with a desire of returning, and of enjoying those pleasures which the imagination is constantly presenting in more glowing colours than are real. After some time the complexion becomes pale and anxious; the appetite is much impaired; the strength sinks, and the body emaciates. The usual enjoyments of life, and the society of friends or acquaintances, afford no distraction from the constant and painful rumination in which the patient is engaged. As the bodily functions become impaired by the continual indulgence of regret, and of the depressing feelings associated with it, the mind is more and more unable to resist a recurrence to the subject of distress, or to break off the train of painful ideas. The patient nurses his misery, augments it until it destroys his nightly repose and his daily peace, and ultimately devours, with more or less rapidity, his vital organs.

6. In some cases, nostalgia assumes a more acute form and rapid progress — *nostomania* — with cerebral irritation or excitement, presenting inflammatory characters. The ideas connected with home present an unreal form, or a state of exaltation amounting almost to delusion. The head becomes hot; sleep entirely departs; the pulse is accelerated; and headach is complained of; and ultimately somnambulism, or more complete mental derangement, may supervene. After this state has continued for some time or in various grades of excitement or modification of phenomena, more or less complete collapse of the functions of the brain and of the powers of life may take place, and the patient die in the course of a few weeks, as in cases described by M. LARRY. In some instances the patient sinks into a state of marasmus,

with symptoms of low nervous or of hectic fever; and in others the complaint passes into phthisis, disease of the lungs being developed during the continuance of the nostalgia.

7. When nostalgia occurs during the progress of other diseases, the complication renders the state of the patient often very critical; heightening the severity of the primary complaint, and either opposing or entirely preventing convalescence. In these circumstances, indulgence of the hopes of return to the scenes of early happiness becomes necessary to the prevention of fatal results.

8. *B. The Diagnosis* of *real* from *feigned nostalgia* is sometimes required. The former is attended not only by sadness, moroseness, vacuity, or absence of mind and love of solitude, but also by remarkable pallor; by a rapidly progressive emaciation and debility, and by increased heat of the forehead. If accidental mention is made of the place or persons of the patient's attachment, his countenance becomes suddenly animated; his cheeks assume a temporary flush, and his eyes are brilliant.

9. *C. The appearances after death from nostalgia* are stated by M. BEGIN to consist of signs of vascular irritation in the superior and anterior parts of the brain; and more particularly in the pia mater and arachnoid covering them. These signs generally consist of injection of the capillaries of these parts; the effusion of an opaline serum in the meshes of the membranes; slight induration or softening of the cerebral substance; and effusion of serum in the ventricles. These changes are constant; but other viscera also often betray disease, especially the lungs, the digestive canal, and the heart; and, in some cases, one or other of these organs present the chief alterations.

10. *D. Treatment.*—Nostalgia requires more of moral than of medical treatment. Kindness, encouragement, and exciting hopes of soon revisiting the scenes for which the patient longs, are generally of the greatest service. Varied amusement, pleasant occupations, and every means which may distract the mind from the indulgence of feelings of regret, should be resorted to. Music, dancing, gymnastic exercises, theatrical amusement, exercise in the open air, hunting, coursing, &c. may be employed according to circumstances. All allusions which may suggest the subject of the patient's misery should be avoided; but the society of persons from the same place may be encouraged, as the griefs of the patient may be allayed by the encouragements and the happiness of his associates.

11. If indications of cerebral excitement appear, the tepid douche, and subsequently the cold affusion on the head, or the shower bath—and the promotion of the several secretions and excretions —should be recommended. If the above means fail, and when a return to home can be accomplished, this most certain of all remedies should not be neglected. It will succeed even when death is apparently approaching, provided that the lungs have not undergone structural change. In the cases of young soldiers, even a temporary return to their homes, or leave of absence from their corps, has been productive of a salutary influence.

BIBLIOG. AND REFER.—*J. Harderus et J. Hoferus*, in *Halleri*, Dissert. ad Med. Pert. 4to. vol. i. — Pensées d'un Allemand sur la Nostalgie, &c. 8vo. Jenæ, 1754. — *R. Hamilton*, in Edin. Med. Commentaries, vol. xi. p. 343. — *Guerbois*, Essai sur la Nostalgie, 8vo. Paris, 1803. — *C. Castelnau*, in Journ. de Méd. t. xii. 8vo. Paris, 1806. — *Therrin*, Essai sur la Nostalgie, 4to. Paris, 1810. — *J. L. Paugnet*, Dissert. sur la Nostalgie, 4to. Paris, 1815. — *Percy et Laurent*, Dict. des Scien. Méd. t. xxxvi. p. 271. — *J, Zaugerl*, Ueber das Heimweh, 8vo. Wien, 1824. — *Begin*, Dict. de Méd. Prat. t. xii. art. *Nostalgie*.

OBESITY.—SYN. *Obesitas*. Πολυσάρκια (from πόλυ, much, and σάρξ, flesh). *Corpulentia*, Pliny. *Polysarcia*, Sauvages, Vogel, Sagar. *Polysarcia adiposa*, Sauvages, Good. *P. faginosa*, Forestus. *Phænigmus plethoricus*; *Empymelium polysarcia*, Young. *Obésité, corpulence, embonpoint excessif*, Fr. *Fette, Volleibigheit*, Germ. *Obesita*, Ital. *Obesity, Corpulence, Morbid fatness.*

CLASSIF.—III. CLASS. II. ORDER (*Cullen*). VI. CLASS. I. ORDER (*Good*). I. CLASS. IV. ORDER (*Author*).

1. DEFIN.—*An accumulation of fat under the integuments or in the abdomen, or in both situations, to such an amount as to embarrass the several voluntary functions.*

2. I. CHARACTERS.—A certain degree of fatness is quite compatible with health, especially in some persons of the sanguine temperament. Other persons also, as well as these, may be lean or fat, at different epochs of life, without any marked difference in their states of health. As long, however, as their general health is not impaired, and the fatness does not amount to a morbid pitch—to absolute obesity—nor impedes the functions of life and volition, it cannot be viewed as a morbid condition. Obesity may occur at any period of life: it may even, in a slight degree, be congenital. Infants often are remarkably fat whilst they are at the breast; the fat being deposited chiefly under the integuments: but after two or three years of age they become gradually thinner, owing to the exercise they are then enabled to take. Obesity in childhood is often the result of over-feeding and of hereditary predisposition; and in rare instances it continues to increase from infancy through the several periods of childhood. It is unnecessary to adduce remarkable instances of obesity in childhood and early life. Several such cases are noticed by Mr. WADD, M. RAIGE DELORME, and Dr. WILLIAMS. They present no very remarkable phenomena, excepting an unusual degree of muscular strength for that age, the obesity of youth differing in this from the obesity of advanced life.

3. With the progress of age, and as the genital organs are developed, the youthful plumpness of the body is diminished, the activity of these organs increasing all the nutrient and excreting functions, more particularly in males. The absence of the testes in eunuchs, and indeed castration of any of the lower animals, has a remarkable influence in favouring obesity. As age advances, especially after the forty-fifth or fiftieth year, when the genital organs lose much of their activity, the tendency to an inordinate accumulation of fat in the œconomy is most remarkably evinced; although various circumstances, as impairment of general tone and vigour, confinement, and want of exercise, the states of the locality and climate, may hasten it, and opposite circumstances delay or prevent it. After the fortieth year, the indulgences of the appetite for food are more frequent, and active physical exertion is either diminished or in a great measure laid aside. Many of the active pleasures of early life are then, or soon

afterwards, superseded by other duties or by the sedentary occupations of life; whilst in females, the peculiar functions they have to discharge, the changes to which they are liable with the advance of age, and the various changes contingent on child-bearing and suckling, tend remarkably to produce obesity.

4. The *situations* in which fat is most liable to accumulate to an inordinate amount are in the subcutaneous tissue, in the interstices between the muscles, in the omentum and mesentery, under the pericardium, around and under the kidneys, in the mediastinum, and around the mammary glands. In cases of the more *sthenic forms* of obesity (§ 9.), the deposition of fat is *general*, or presents a certain relative proportion in these and other places where it usually accumulates; and, unless the accumulation is excessive, the functions of the body, excepting those of volition, are not materially impeded. But when obesity becomes truly great even in these, and still more remarkably in the *asthenic* form, and in more cachectic or leucophlegmatic habits, volition, respiration, and circulation are remarkably embarrassed, especially upon attempts at physical exertion, and upon mental emotion: the digestive, assimilating, and excreting functions being both primarily and consecutively impaired.

5. In many cases, particularly of morbid accumulations of fat, the obesity is *partial*. This is most frequently observed in the omentum, giving the appearance termed a pot-belly, in the mammæ, neck, in the abdominal parietes and nates, or haunches of females, and around the kidneys. In a very remarkable case of fatness in a female between fifty and sixty years of age, and in which death occurred from internal strangulation of the intestines, under the care of Mr. JONES and the Author, remarkable collections of fat into bag-like masses or tumours were observed to be attached to, or rather to hang down from each axilla; the fat under the abdominal parietes being about six inches deep. Instances of partial fatness of a strictly morbid kind are met with also in other situations. The most remarkable, and at the same time the most dangerous, of these, is the accumulation of fat in the parietes of the heart, where it occasions atrophy, softening, pallidity, and weakness of the muscular fibres, favouring passive dilatation and even rupture of the cavities. (See ART. HEART, § 227. *et seq.*)

6. The *amount* of obesity varies remarkably; and it is often difficult to draw a line between the fatness consistent with health, and that which may be viewed as morbid. The transition from the one to the other is gradual, and the progress to the latter, as well as its more unequivocal existence, is characterised by impaired vital energy and tone, as manifested particularly by the digestive and assimilating functions. The fat usually found in the healthy body has been estimated at various amounts, from one-tenth to one-fifteenth of the weight of the body. In extreme cases of obesity, the fat may constitute two-thirds or four-fifths of the entire weight. Mr. LAMBERT weighed 52 stone 11 lbs.; and in his case, probably the proportion of fat to the other parts of the body was even greater than that just assigned.

7. In the medical consideration of obesity it is requisite to view the accumulation of fat as merely a part—a part more or less prominent—of functional disorder, and even sometimes of more serious and extensive disease. The external and physical characters which the obesity presents, and the various phenomena and functional aberrations with which it is associated, will generally indicate, not only its pathological sources, but also its probable consequences; and point out the kind and extent of professional interference, and of personal management it may require, as either an incipient, an advanced, or even an almost irremediable constitutional mischief.

8. There are several points to which attention should be directed, in estimating the character, tendencies, and probable consequences of obesity, as furnishing the basis of a rational treatment of it. These are the evidences furnished of the *states of vital power* as manifested chiefly in the digestive, assimilating, and excreting functions; of the conditions of the respiratory and circulating organs, and of the blood; of the muscular structures and actions, and of the general surface and appearance. The pathological conditions and tendencies of a case are indicated by them; and in proportion as these are impaired, so is the health deteriorated, whatever may be the amount of obesity. According to the states of these functions and organs, obesity has been divided into *sthenic* and *asthenic*, the transition from the extreme of the former to the extreme of the latter being gradual and presenting no break.

9. *a.* When the organic or strictly vital functions are not materially impaired; when the respiratory and circulating actions proceed without material disorder, unless upon physical exertions which obesity may embarrass or impede; when the blood is not apparently deficient in quantity or quality; when the muscles are not emaciated nor deficient in firmness or power; and when the countenance and general surface retain their usual appearances or a healthy hue, the *sthenic character* is present; and in proportion as these evidences are furnished, in like proportion this state of vital manifestation exists. It is of the utmost importance, as respects not only obesity itself, but also the treatment of diseases which occur in fat persons, that the states of vital power, and of the circulation, particularly as regards the quantity of the blood, should be correctly estimated.

10. *b.* In proportion to the departure from these states of healthy function, — as the vital powers become impaired; the respiration short, puffing, or asthmatic; the circulation embarrassed, the blood deficient, watery, or dark; as the muscles are weak, flabby, or emaciated, and the fatty accumulations soft or leucophlegmatic; and as the countenance becomes bloated, the surface sallow or of an unhealthy hue,— so obesity, however great it may be, should be viewed as being *asthenic*, and more especially morbid, as regards its existence and its consecutive states. In this form of obesity, intercurrent visceral or internal disease often pursues a rapid and unfavourable course; and the inexperienced practitioner, misled by the fatness and apparent vascular fulness of the patient, is often induced to take away a part of the already deficient blood. I have on several occasions met with such occurrences, the remarkable deficiency of blood being evinced, on dissection after death, by the blanched state of the viscera and structures. In all cases of asthenic obesity, lowering or depletory measures are not well endured, even in the treatment of acute diseases affecting subjects thus circumstanced; or, if at all adopted, they

should be aided by derivative and restorative means.

11. II. CAUSES.—The *causes of obesity* are chiefly *predisposing*, for, unless the predisposition be strong, the *exciting causes* are generally inoperative. — *a.* The *predisposing causes* are, chiefly, a peculiar diathesis, temperament, or habit of body *hereditarily* transmitted; inactivity, indolence, and quietude of body and mind; a lively, happy, and sanguine disposition; sedentary occupations, and a heavy or insufficiently pure or renewed air. Where the hereditary predisposition is strong, moderation in both food and drink will not prevent obesity, unless very active exercise be taken, or even great or continued exertions may be made, in the open air; and where no such predisposition exists, large quantities of food and drink may be taken without any change from a state of leanness. The constitutional predisposition to obesity varies much in its character, with the state of the powers of life, and with the conformation of the frame. Persons of strong conformation, of the sanguine temperament, and of good health, if fully and richly fed — if they partake of much oily and carneous food, and of malt or vinous liquors — often become fat, although they take much exercise, especially when they advance in age, or live in the close air of towns; and if these persons, after having had the advantage of active exercise in the open air in early life, are obliged to forego this advantage, and are devoted to sedentary occupations, obesity sooner or later overtakes them — sometimes with great rapidity, if they live thus fully and richly. But in them obesity generally presents more or less of the *sthenic* character, unless their general health has been previously injured, or their confinement to an insufficiently renewed air has been close or prolonged. Others, who take considerable exercise, enjoy good health, and eat heartily of nutritious food, become fat, although not in remarkable excess; and in them obesity always presents the sthenic character.

12. In persons of a weak or lax fibre, of a leucophlegmatic temperament, and weak vital or constitutional powers, obesity is frequently hereditary; and is apt to occur, even without this predisposition, if they enjoy in abundance the necessaries and luxuries of life; but it always assumes an *asthenic* or atonic form. In these, the appetite is generally much greater than the powers of complete digestion and assimilation; the pulse is soft, languid, and weak, and the excretions are scanty. Obesity often occurs in those who have been weakened by excesses, by long confinement in a close atmosphere, or by disease, and is frequent in the advanced periods of life, and in those of a cachectic habit of body. It occasionally is consequent upon torpor and chronic disease of the liver, and upon protracted dyspepsia; and in some instances it is attendant upon scanty menstruation, partial anæmia, and slight chlorosis in young females. In these cases more particularly, the muscles are pale, flabby, and wasted, in proportion to the accumulation of fat, which is soft, flabby, or semifluid.

13. *b.* The *more immediate or exciting causes* of obesity are sufficiently obvious; — is generally a full and rich diet and a life of ease, — the partaking of food and liquors beyond what is requisite for the waste and wants of the economy, for the amount of exercise which is taken. Soldiers and sailors do not become obese during a campaign; but change their duties, give them plenty of rest, or make them landlords of inns, butlers, butchers, &c., and more than one half of them would soon be corpulent. It is the *quantity* more probably than the *quality* of the food which fattens; still many substances, particularly such as are oily and saccharine, promote obesity more remarkably than others. Fat meats, butter, oily vegetable substances, milk, saccharine and farinaceous substances, are the most fattening articles of food: whilst malt-liquors, particularly rich and sweet ale, are of all beverages the most conducive to the same end. The fattening effect of figs and grapes, and of the sugar-cane, upon the natives of the countries where these are abundant, are well known. In various countries in Africa and the East, where obesity is much admired in females, warm baths, indolence, and living upon saccharine and farinaceous articles, upon dates, the nuts from which palm oil is obtained, and upon various oily seeds, are the means usually employed to produce this effect. Amongst the Asiatics, farinaceous articles, sugar, sweetmeats, milk, butter, and vegetable oils, are chiefly indulged in with this object.

14. Many years ago I was consulted by a lady who, at the early age of about thirty-six years, had become excessively corpulent: and the circumstance of her having diminished the quantity of her food to the utmost extent, her obesity still increasing notwithstanding, had rendered her more anxious respecting it. After various inquiries respecting her modes of living, it appeared that she partook of very little of the usual articles of food, and of none of the fermented or distilled beverages, but she ate very large quantities of white sugar, to which she had taken a great liking. The cause was now obvious, as was the cure. The influence of malt-liquors, particularly such as abound most in saccharine matter, is very manifest. Instances in proof of this influence, calculated more to amuse than to instruct, have been adduced by WADD and others.

15. Rest, indolence, ease of mind and body, too much sleep, sleeping after a full meal, too much food, and indulgence in any kind of vinous, spirituous, or malt liquor, are the chief causes of obesity; the predisposing and constitutional causes (§ 11.), imparting to it the distinctive characters of *sthenic* and *asthenic* above assigned to it.

16. III. PATHOLOGY. — I have briefly stated the nature of obesity in the article on the pathology of the ADIPOSE TISSUE, (§ 3.); and my views, there exhibited, are in accordance with those since published by LIEBIG, in some respects, but different from them in others, as he imputes too much to chemical affinities or actions, and keeps out of view the controlling influence of vitality. The abnormal condition, according to LIEBIG, which occasions the deposit of fat in the animal body depends upon a disproportion between the quantity of carbon in the food, and that of oxygen absorbed by the skin and lungs. In the normal condition, the quantity of carbon given out is exactly equal to that which is taken in with the food, and the body acquires no increase of weight from the accumulation of substances containing much carbon and no nitrogen. If we increase the supply of highly carbonised food, then the normal state can be preserved only on the condition that by exercise and labour the waste of the

body is increased, and the supply of oxygen augmented in the same proportion. The production of fat is always a consequence of a deficient supply of oxygen, for oxygen is absolutely indispensable for the dissipation of the excess of carbon in the food. LIEBIG further argues that, since in all fatty bodies there are contained, on an average, only 10 equivalents of oxygen for 120 equiv. of carbon, and since the carbon of the fatty constituents of the animal body is derived from the food, seeing that there is no other source whence it can be derived, it is obvious, if we suppose fat to be formed from albumen, fibrine, and caseine, that, for every 120 equivalents of carbon deposited as fat, 26 equivalents of oxygen must be separated from the elements of these substances; and further, if we conceive fat to be formed from starch, sugar, or sugar of milk, that for the same amount of carbon there must be separated, 90, 104, and 110, equivalents of oxygen from these compounds respectively. There is, therefore, but one way in which the formation of fat in the animal body is possible, and that is, a separation of oxygen from the elements of the food. Thus he infers that the surplus of oxygen, or the oxygen disengaged during the conversion of food into fat, goes to the support of respiration, and to supply, in part, the oxygen which is too sparingly furnished by respiration.

17. There may be much truth in these views — they are probably true in part — but LIEBIG does not sufficiently estimate the influence of the vital power in producing and controlling the combinations of the animal elements, whilst these elements and their combinations are within the sphere of this influence. The various changes which the food undergoes from the moment of its mastication, are produced by this influence, aided by the secretions poured into the alimentary canal, in the first instances, and by the oxygen of the atmosphere subsequently, when the product of digestion is conveyed into the circulating system.

18. But LIEBIG states, that "the most decisive experiments of physiologists have shown, that the process of chymification is independent of the vital force; that it takes place in virtue of a purely chemical action, exactly similar to those processes of decomposition or transformation which are known as putrefaction, fermentation, or decay." Now we have here to take M. LIEBIG's word for the decisiveness of the experiments to which he refers; for he has neither adduced, nor referred to, any of them. The fact is, that these experiments prove the converse of his proposition; and common sense and observation prove it still more strongly, for we have, from all these sources, every reason to infer that the quantity, and probably also the quality of the gastric juice are influenced by the states of vital and organic nervous power. That the action of the gastric juice upon the masticated food is identical, neither with fermentation, nor with putrefaction, nor with decay, is most probable; that it is somewhat similar to each or to all may be admitted; but that it is purely chemical, as inferred by LIEBIG, requires further proof. That the gastric juice exerts a certain degree of action when it is removed from the system is no proof that this action is either purely chemical, or entirely independent of vital influence; for it is sufficiently shown, that all the recrementitious secretions possess a certain emanation or endowment of vitality, which is soon dissipated; and as soon as it is dissipated, decomposition supervenes. That a transformation takes place in consequence of the admixture of the gastric juice with the food is all that we know; that this transformation may be fermentive, or putrefactive, or chemical, as respects certain of its aspects, may be admitted; but that it is neither the one nor the other altogether, that it is peculiar in many respects, and that it is influenced by the states of vital and organic nervous power, are sufficiently manifest on a comprehensive view of the subject. That the gastric juice acts to a certain extent upon food enclosed in perforated balls, or even when entirely removed from the stomach, so as even to give the food the appearance of chyme may even be conceded; but that the change is complete, or altogether such as it would have been if it had been subjected to the vital influence of the stomach and duodenum, in the natural process of digestion, is not proved.

19. IV. TREATMENT. — The indications and means of cure are, in many cases, very obvious and easily prescribed; but they are rarely even partially adopted, and still more rarely adopted in all their parts, by the patient. *Temperance* in eating and drinking, and *active exercise* in the open air, — the avoidance of the chief causes of obesity — are easily insisted on; and proofs of the efficacy of the recommendation are sufficiently strong. But the patient, however well he may be convinced of the propriety of this advice, has seldom strength of resolution to adopt it, particularly as respects the curtailment of those pleasures furnished by the palate, the indulgence of which become only the more inveterate as we advance in age, and which are the last of the sensual gratifications which are relinquished.

20. *A*. In the more *sthenic forms* of obesity, all articles abounding in fat or oil should be relinquished, and lean and white meats, the lighter kinds of fish, brown or rye bread, turnips, greens, and others of the less nutritious vegetables, ought to constitute the chief diet; and even these should be taken in moderation. Active exercise, particularly on foot, or on a rough trotting horse, gymnastic amusements and exercises, and the shower or cold bath, followed by active frictions of the limbs and trunk by the patient himself, are also most important parts of the treatment. Early rising and exercise before breakfast; and a moderate indulgence in sleep, avoiding it after dinner or during the day, ought also to be enforced. The treatment of this form of the complaint is altogether *regimenal*, little or no medicine being requisite, beyond what may be necessary to preserve the secretions and excretions free, or to control injurious local determination of blood, as it may occur. It has, however, been recommended to impair the appetite by giving the patient nauseating doses of antimony, of squills, or of ipecacuanha. The last of these is the safest, and it only should be employed, if a recourse to this indication be determined upon. But it is much safer to trust altogether to temperance and exercise than to other means which may be productive of disorder. If the appetite be painfully craving in the intervals between meals, the patient may take a camphor lozenge or chew a small piece of camphor with advantage; but smoking cigars or tobacco of any kind, although often efficacious, is ultimately injurious to the digestive

functions and nervous system. It is preferable to endure hunger for a time; after some days this sensation will become less urgent, and abstinence be more easily tolerated.

21. A recourse to acids, whether mineral or vegetable, in order to reduce or to prevent obesity is generally injurious, especially if persisted in for a period sufficiently long to produce this effect, and is apt, not only to injure the digestive organs, but also to favour the occurrence of disorders of the urinary organs, and of rheumatic and gouty affections. The employment of soap and alkalies, as advised by Dr. Flemyng, is, upon the whole, safer than the use of acids, particularly in the gouty and rheumatic diatheses. But the prolonged use even of these, is liable to induce chronic disorders of the kidneys and bladder.

22. *B.* The treatment of *asthenic obesity* should depend mainly upon the disorders of the digestive and assimilating organs with which it is often associated and as often the result. In females, this form of obesity is frequently complicated with disorder of the uterine organs, and hence attention ought to be paid to this circumstance. In this state of the complaint, also, temperance and exercise in the open air are the most important parts of the treatment. When the liver is torpid, the nitro-muriatic acids may be prescribed, or Plummer's pill with soap, the bowels being duly regulated by means of stomachic aperients or purgatives. The same means may be employed if the liver should be inferred to be enlarged or obstructed, or the iodide of potassium may be taken with liquor potassæ, and the compound decoction of sarza. In some cases, the preparations of iron may be given, particularly the tincture of the sesquichloride, or the alkaline preparations of iron. In most instances of asthenic obesity, change of air, travelling, and a course of mineral waters suited to the peculiarities of the case, as the alkaline, the chalybeate or the saline, as circumstances may require, should be recommended, and aided by suitable diet and regimen.

Bibliog. and Refer. — *H. Hoffmann*, Thesium Medicorum Semicenturia de Pinguidine, 4to. Altd. 1674.— *Ettmuller*, De Corpulentia nimia, Opera, 4to. Lips. 1681. Pars. ii. p. 878. — *J. E. Schapper*, Epist. de Obesitate nimia, Opera, 4to. Rost. 1701. — *Kuehn*, Nova Act. Academ. Natur. Curiosor. t. i. p. 225. — *Fr. Hoffmann*, Opera, Suppl. t. ii. p. 537. fol. Halæ, 1718. — *T. Short*, Discourse on the Causes and Effects, Prevention and Cure, of Corpulency, 8vo. Lond. 1727. — *J. C. Pohl*, in *Halleri*, Disput. Anat. t. iii. Laus. 1734. — *M. Flemyng*, A Discourse on the Nature, Causes, and Cure of Corpulency, 8vo. Lond. 1760. — *G. Baker*, in Med. Transact. of Coll. Phys. vol. ii. p. 259. — *W. X. Jansen*, Abhandlung von dem Thierischen Fette, 8vo. Halæ, 1786. — *J. Tweedie*, Hints on Temperance and Exercise in the Case of Polysarcia, 8vo. Lond. 1799. — *Dupuytren*, in Journ. de Méd. &c. Oct. 1806. t. xii. p. 262. — *L. Maclean*, Inquiry into Hydrothorax, ch. viii. 8vo. Sudbury, 1810. — *A. Maccary*, Traité sur la Polysarcie, 8vo. Paris, 1811. — *Cursory* Remarks on Corpulency. By *M. R. C. Surg.* (W. Wadd). 8vo. Lond. 1813. — *Percy et Laurent*, in Dict. des. Sc. Méd. t. xxxvii. p. 1. — *W. Wadd*, Cursory Remarks on Corpulency or Obesity, 8vo. Lond. 1822.; and Comments on Corpulency, Lineaments of Leanness, &c. 8vo. Lond. 1829. — *Raige-Delorme*, Dict. de Médecine, t. xvi. art. *Polysarcie* — *Williams*, Cyclop. of Pract. Med. vol. ii. p. 189.

ŒDEMA. — Syn. Οιδημα (from οιδεω, I swell), Dioscorides. *Œdema*, Sauvages, Vogel, Sagar, &c. *Leucophlegmatia*, Plater. *Ecphyma œdematicum*, Young. *Œdème, Œdématie, Enflure,* Fr. *Geschwulst, Wassergeschwulst,* Germ. *Edema*, Ital. *Puffing, watery swelling,* &c.

Classif. — IV. Class. IV. Order (*Author*).

1. Defin. — *A swelling occasioned by the effusion or infiltration of water or serum in cellular structures.*

2. Although the sub-cutaneous cellular tissue is most frequent, it is not the only, seat of œdema. Slight effusion of serum is also occasionally observed in the sub-mucous and sub-serous cellular tissue, and in the cellular parenchyma of the viscera. Œdema of the *sub-mucous* or *sub-serous cellular tissue* seldom gives rise to symptoms of sufficient importance to point out the nature of the lesion. Œdema, however, of certain of the most important organs may be recognised during the life of the patient, especially *œdema of the glottis* (see art. Larynx, § 67.), and *œdema of the* Lungs (see art. Lungs, § 166.). *Œdema of the brain* is not so readily recognised, and is of much rarer occurrence than that of the lungs; and is chiefly observed in the insane, particularly in the subjects of general insanity, in its more chronic and apathetic states. In whichever situation œdema may occur, it presents either a *passive* or an *active* character.

3. *A. Passive œdema* — *the cold œdema* of some authors — proceeds from the retardation or suspension of the circulation either of the veins or of the absorbents, or from impaired or impeded action of the heart, and consequent interruption of the venous circulation. — *a.* It may arise from obstruction or obliteration of one or more veins; from a varicose state of the veins; from preserving for too long a period the same position, the physical overcoming the vital influence, as in standing for a long period; from a weak action of the heart; from want of action of the muscles, whereby the venous circulation is unaided, as observed in cases of palsy, which is often attended by œdema; from a thin watery or morbid state of the blood, often connected with deficient tone of the organic nervous system, as in chlorosis, scurvy, &c.; or from the superabundance of water in the blood, as in granular and other diseases of the kidneys, and in suppression of the cutaneous perspiration.

4. *b.* On *examination after death*, the volume of the part is found increased by the exhalation of serum in the meshes of the cellular tissue. The surface of the swollen part is generally pale; and, upon incising the part, the serum escapes in a fluid state; but sometimes, particularly when the serum is albuminous, it is retained in the cellular meshes, and presents a gelatinous appearance. The same characters are observed in all cases of passive œdema of the cellular, sub-cutaneous, sub-mucous, and sub-serous cellular tissues. Passive œdema of parenchymatous organs increases the bulk of these organs; but in other respects presents the same appearances as those just mentioned. The structure of the œdematous organ is sometimes a little discoloured, and when firmly pressed by the finger it retains the impression, as observed in œdema of the sub-cutaneous cellular tissue. When incised, the divided surface permits the escape of the effused serum in drops; but when the serum is pressed out, the parenchyma of the organ presents no further lesion than rarefaction by the evacuated fluid.

5. *c.* The *symptoms of passive* or *cold œdema* readily distinguish it from *active*, or *warm œdema* (§ 6.). The pallor and coldness of the surface, the depression following the pressure of the finger,

the state of the pulse, and the absence of febrile action, are sufficient to point out the passive form of this lesion. The *nature* of the obstruction causing the œdema is sometimes indicated by the appearances presented by the œdematous part: thus, when the obstruction is in the veins in the vicinity of the part, the superficial veins are often distended. When the obstruction is remote or central, or when the œdema is produced by the state of organic nervous power, or of the blood, this condition of the superficial veins is not observed; and the surface is generally pale. The *seat* of the œdema also often points out the obstruction occasioning it: thus œdema of the face, commencing generally in the eye-lids, is commonly caused by obstruction to the circulation through the heart, particularly its left side, and is frequently consequent upon hydrothorax caused by this lesion; and upon congestive inflammation of both lungs. Œdema of the lower extremities most commonly follows obstruction in the right side of the heart. Œdema of the upper extremities generally precedes that of the lower, in cases of hydrothorax; and sometimes œdema occurs in the side of the face, and in the hand corresponding with the side of the chest in which the effusion exists, when one cavity only is the seat of effusion. Œdema of the face and of the extremities may occur equally, or about the same time, in disease of the kidneys, with superabundance of serum in the blood, or with other alterations of this fluid. Œdema of the lower extremities may proceed from the pressure of the gravid uterus, or of pelvic tumours, or of accumulated fæces in the cæcum or colon, or of enlargement of an undescended testes (*Author*), or of enlarged glands, and from disease of the veins or absorbents, as well as from obstruction in the right side of the heart. Œdema of the male genitals proceeds from the same lesions as occasion œdema of the lower extremities; but it may also arise from strangulation by the prepuce, or from urinous infiltration. Œdema of the female genitals is usually caused by pregnancy.

6. *B. Active, or warm œdema*, is not so frequent as the former variety.—*a.* It is sometimes connected with inflammatory action in the part, or in the vicinity, especially with *asthenic* inflammation, or that weak state of inflammatory action which occurs in weak, cachectic, or leucophlegmatic persons, or lymphatic constitutions, and which has been termed by some *hydro-phlegmasia.* It attends, in a more or less remarkable form, certain states of Erysipelas — the *œdematous* especially — and diffusive inflammation of the cellular tissue. It is, in every respect, a state or form of inflammation of the cellular tissue. The surface is not only swollen, but is also warm and generally coloured, sometimes with various shades of deepness. It is often somewhat firmer to the touch, and does not pit from pressure so readily as in the passive form.

7. *b. Upon dividing the œdematous part*, the effused fluid is frequently different from that found in the passive variety. It is often sero-puriform; occasionally the serum is sanguineous, sanious, or sanguineo-puriform. It is also sometimes purely serous, of a yellowish tint. The predominance of either serous or puriform characters differs much in different cases. The same appearances are often observed in the vicinity of inflammation of parenchymatous organs, as in œdema of the lungs occurring in the vicinity of inflamed parts of the organ.

8. *b.* The *diagnosis* of active œdema is easy. The increased temperature of the part, the occasional redness of the surface, and pain or tenderness from pressure, the state of the circulation, and the general febrile commotion, sufficiently distinguish active from passive œdema. The former usually appears more suddenly, and proceeds more rapidly, than the latter; and is often consequent upon deep-seated suppuration, or upon the presence of irritating matters in the circulation. In this latter case, the fluid effused is generally of an irritating and contaminating nature, inducing unhealthy suppuration, or sloughing, of the cellular tissue in which it is effused, or through which it extends.

9. *c.* The *prognosis* is important in respect both of the constitutional and of the local relations of œdema. In the passive form, the œdema indicates a most serious, and even dangerous, condition of the circulating system, or of the kidneys. In the active state, the danger may not be so great, particularly when the œdema is associated with inflammation in its vicinity: but even then, it should suggest the presence of inflammation of either the veins or absorbents, or even of both, or at least pressure upon, or interrupted circulation through, the trunks of veins. When œdema is connected with a morbid state of the circulation, with irritative fever, or is symptomatic of deep-seated suppuration, &c. (§ 8.), it should be always viewed as indicating great danger, if not increasing it.

10. *d. Treatment.* It is unnecessary to enter more fully into the treatment of œdema than to remark, that the means of cure should be directed to the pathological condition or cause of which œdema is merely a symptom; and that the principles and means of cure which have been advised for *anasarca* (see art. Dropsy, § 132. *et seq.*) should be employed for it. When the œdema is consequent upon deep-seated suppuration or is erysipelatous, then the constitutional and local means prescribed for the œdematous and gangrenous states of Erysipelas (see that art.), or for diffusive inflammation of the Cellular tissue (§35.), or for Asthenic inflammation (§ 236.), are the most appropriate; the various physical or mechanical causes which may operate in particular cases being removed.

Biblioc. and Refer. — *J. G. Knelm*, Von den Wässerigten Geschwuelsten und deren Behandlung, 8vo. 1793. — *L. E. Brulet*, Essai sur l'Œdème, 4to. Paris, 1804. — *Merat*, in Dict. des Sciences Méd. t. xxxvii. p. 132. — *Bateman*, in Edin. Med. and Surg. Journ. vol. iii. — *J. Bouillaud*, in Dict. de Méd. et Chirurg. Prat. t. xii. art. *Œdème.* — *J. Darwall*, in Cyclop. of Pract. Med. vol. iii. p. 196. — *G. F. Most*, Encyklopäthie der Gesammten Medicineh. u. Chirurg. Praxis, t. ii. p. 517. — (See also Bibliog. and Refer. to art. Dropsy.)

ŒSOPHAGUS, DISEASES OF THE — *Œsophagus* (from οιω, οιζω, fut. οισω, I carry, and φάγω, φαγος, I eat, &c.). *Œsophage*, Fr. *Die Speiseröhre, der Speisenträger*, Germ. — There are two portions of the alimentary canal, the diseases of which have been very generally overlooked by systematic and practical writers in this country, and which have received but an imperfect notice from foreign authors. I allude to the *œsophagus* and *cæcum.* The former is perhaps less frequently diseased than any part of the

canal; the latter is, as I have shown in the article Cæcum, one of the most liable of the organs of the body to functional disorder and organic change. Through the one, the passage of the ingesta is rapid, and on it their effects are slight or transient, unless when they are of a most irritating and noxious kind: through the other the passage of alimentary and fæcal matters is remarkably slow and liable to interruptions, and hence injurious impressions are made on the containing parts by morbid or irritating states of the contained substances, and hence, probably, is partly owing the less frequency of diseases of the *œsophagus* compared with those of *cæcum*. Still the diseases of the œsophagus are much more common than have been supposed; the little attention which has been paid to them having been the cause of their being overlooked in many cases in which they were actually present. And when we consider the frequency of diseases of the pharynx and throat on the one hand, and of diseases of the stomach on the other, we can hardly infer that the œsophagus should escape participating in them so generally as has been supposed.

2. In discussing the diseases of the œsophagus I shall *firstly* give a rapid sketch of the *structural changes* which this canal occasionally undergoes in the course of diseases in which it is implicated; and I shall next consider, in succession, the most *important of the maladies* which occasion these changes, with the *consequences* which they usually produce, the *symptoms* by which they are indicated, and the *treatment* they require.

I. Structural changes of the Œsophagus.

Classif. — IV. Class, I. Order (*Author*).

3. The œsophagus presents organic lesions less frequently than the mouth and pharynx, and still less so than the lower parts of the digestive canal. — *a.* The *epithelium* covering its mucous surface is sometimes eroded, softened, or even destroyed, at its inferior part. This is often met with in children at the period of weaning, and in those who have been imperfectly or improperly nourished. M. Andral has found the epithelium remarkably thickened.

4. *b.* The *mucous membrane* of the œsophagus is but seldom inflamed or congested with blood compared with other parts of the digestive canal, unless consecutively upon eruptive diseases, particularly scarlatina. It is generally injected or congested with black blood in rabies, especially its upper portion. It is sometimes *thickened* either generally or in parts. Its *follicles* are occasionally enlarged and apparently congested and obstructed, particularly in young subjects and in mucous or gastric fevers. *Vegetations* or *excrescences*, of various sizes and forms, have been found to shoot from it, narrowing the passage and most seriously obstructing deglutition. Cases of this description are mentioned by Schneider (in Haller's *Collect. Dissert.* viii. No. 258.), Dallas and Monro (*Edin. Essays and Observ.*, v. iii.), and Baillie. *Ulcers* are, perhaps, less frequently observed in this part of the digestive tube than in any other. I have, however, met with several cases of this lesion, which is not infrequent in children. Ulcers in this situation have been described and delineated by Sandifort (*Museum Anatomicum*, tab. civ. fig. 3.) and Baillie (*Series of Engravings, &c.*, fasc. iii. pl. 3. and 4.); but notwithstanding that Brunner had described ulceration of the œsophagus as commencing in its mucous follicles, this form of ulceration has been overlooked by those pathologists. I shall, therefore, notice this lesion more fully in the sequel. *Agglutination* of the opposite parietes of the œsophagus, by coagulable lymph thrown out upon its mucous coat, has been said to have been found in a fatal case of small-pox (Bartholinus, *in Act. Hafn.*, t. i. obs. 109). This is, however, an extremely rare occurrence. Exudations of lymph, forming a false membrane upon the mucous surface of the canal, is not rare, and is found generally in the upper part of it, in cases where this exudation is thrown out over the tonsils and pharynx (see §. 23.).

5. *c.* The *sub-mucous cellular tissue* of the canal is sometimes inflamed or congested, in the same circumstances as those just mentioned: infiltrations of serous, sero-puriform, or sanious fluids are also observed in it as consequences of inflammation. It may also become *thickened* and *indurated*, particularly after protracted inflammatory irritation. It may be transformed into a *fibro-cartilaginous* substance, or into *scirrhous* structure, thereby narrowing, even nearly to complete obliteration of, the tube. Instances of *scirrhous degeneration* of the tube, passing into the ulcerative or *carcinomatous state* are not rare, especially in the extremities of it; but simple thickening and induration caused by chronic inflammation have often been mistaken for scirrhus. Transformation of a portion of the tube into a *cartilaginous state* has been observed by Morgagni, Haase, and others. This canal may be partially or entirely obstructed also by *abscesses* formed in its parietes or even exterior to them; or by the growth of *tumours* in its vicinity: thus slowly increasing difficulty of swallowing attends upon aneurism of the aorta, or upon a mass of obstructed lymphatic glands pressing upon the œsophagus. Bleuland has seen this effect produced by exostosis of the body of a vertebra. The dysphagia, however, which proceeds from these causes is seldom so urgent or distressing as that which depends upon disease of the coats of the tube.

6. *d. Softening* and *attenuation* of the œsophagus are occasionally met with, and these states may even go on to spontaneous perforation, presenting all the anatomical characters which this lesion evinces in the stomach. — *Gangrene* of the tube is very rare. I agree with M. Andral in considering the majority of cases of this occurrence recorded by authors as pulpy softening of the part, which is not uncommon in infants and children. It, however, sometimes occurs, especially near the pharynx in malignant scarlet fever.

7. *e. Perforation* of the œsophagus generally is followed by effusion into the thorax. M. Andral states that the perforation in all the recorded cases has taken place in the thoracic portion of the canal near the cardiac orifice; and the surrounding part of the parietes has sometimes been found altered and softened, and at other times without any appreciable alteration. There are, however, cases on record in which the perforation had taken place about the middle and upper part of the tube. The perforation in a case attended by me was above the middle of it; and similar instances are published by Kade (*De Morbis Ventriculi*, &c. Halæ, 1798.), and by Reil (*Memorab*,

Clin., fasc. i. p. 13.), who met with it in cases of typhus fever.

8. Perforation of the œsophagus occurs at all ages. M. Veron met with it in an infant just born. M. Guersent observed it in a child of seven years of age. M. Bouillaud found it in an adult, in whose stomach four perforations also existed. I have seen it in a child. It occurs more frequently at the periods of infancy and childhood than at any other. In some cases, the perforation is stopped by the aorta or trachea, so that no effusion takes place. In other cases, a double perforation occurs, and the canal of the œsophagus communicates with that of the trachea or even of the aorta. Instances of the communication of the œsophagus with the trachea in this manner have occurred to Zeviani (*Memorie de Fisica di Verona*, t. vii.), Monro (*Morb. Anat. of the Gullet*, &c., 8vo. 1830, p. 373.), and to myself. In the majority of cases of perforation, the ulceration appears to commence in one of the follicles (see § 37.).

9. *f. Purulent* and *tubercular* matters have sometimes been found underneath the mucous membrane of the œsophagus. *Albuminous exudations* also form either in patches, or to such an extent as to form false membranes, as already noticed (§§ 4. 23.). M. Guri found a layer of whitish firm matter adhering closely to the mucous surface in a new-born infant; and Hildenbrand states that its formation is not infrequent, but that it generally separates and passes into the stomach, being rarely excreted upwards. This agrees with what I have observed in some cases of epidemic croup and scarlet fever.

10. *g. Dilatation* of the gullet seldom occurs unless, as remarked by Portal (*Anat. Med.* t. v. p. 204.), from stricture of the cardia and of parts of the tube below the dilatation. In some cases the dilated part forms a large sac, a portion of which falls lower than the seat of stricture, constituting a kind of diverticulum. Cases of this description have been noticed by Isenflamm and Sandifort (*Med. Anat.* t. i. p. 242.).

11. *h. Polypous excrescences* have been found shooting from the internal surface of the gullet, narrowing the passage and obstructing deglutition; but they occur less frequently in this situation than in the pharynx. They present the same appearances as in other situations, and have been noticed by Pringle, Monro (*Edin. Essays and Observ.*, vol. iii.), Baillie, Graeffe, and Schneider (see Haller's *Coll. Dissert.*, vii. No. 258.). They often grow from a pedicle sufficiently long to permit of their rising into the pharynx upon efforts to vomit.

12. *i. Cartilaginous* and *osseous* degeneration of the œsophagus are observed in rare instances and generally confined to a small portion of the tube, forming a kind of ring. Gyser (*De Fame Lethali ex Calloso Œsophagi Angustia*, 4to, Argent. 1770.) found a cartilaginous ring, stricturing the canal so as to prevent the passage of a sound. Similar cases have been recorded by Becker, Bang, Baldinger, Andral (*Anat. Pathol.* t. i. p. 276.) and others. Cartilaginous degeneration of the gullet in its whole extent has been said to have occurred to Sampson (*Miscell. Curios.* &c. Ann. 1613.), Garnia (Morgagni, *De Sed. et Caus. Morb.* epist. xxviii. 15.), and Desgranges (*Journ. de* Boyer *et* Corvisart, &c. t. iv. p. 203.). *Osseous* and *cretaceous deposits* are also very rarely met with in the parietes of the gullet. Instances, however, have occurred to the elder Monro, Abrahamson (in Meckel's *Archiv.* b. i. st. iii. p. 16.), and to Walther (*Mus. Anat.* b. i. No. 278.).

13. *k. Rupture* of the œsophagus has been very rarely observed. Instances of its occurrence after vomiting and muscular efforts have been published by Boerhaave, Zeisner (*Disser. de Raro Œsophagi Morbo. Regiom.* 1732.), Sedillot (*Recueil Périodique*, t. vii. p. 194.), Meier (Baldinger's *Magazin*, b. iii. p. 399.), Guersent (*Bulletins de la Faculté de Méd.* Z. 1.), by Bouillaud (*Archives Génér. de Méd.* t. i. p. 531.), and by Mr. W. King (*Guy's Hosp. Rep.* part xv.). In all these the parietes of the œsophagus have been either ulcerated, rupture taking place in the seat of ulceration, or softened and attenuated in the manner already described (§ 4.).

II. INFLAMMATION OF THE ŒSOPHAGUS. — Syn. *Œsophagitis; Inflammatio Œsophagi; Inf. Gulæ*, Auct. *Œsophagite*, Fr. *Entzündung der Speiseröhre*, Germ.

Classif. — III. Class. I. Order (*Author*).

14. Defin. — *Pain between the shoulders, or behind the trachea or sternum, augmented by deglutition, which is rendered more or less difficult or even impossible, with symptomatic fever*, &c.

15. Inflammation of the œsophagus occurs more frequently in a *complicated* and *consecutive*, than as a *simple* and *primary* disease. It varies as to its *intensity* and form or *character*, and as to the particular tissues of the canal in which it may occur. It may be *acute, subacute*, or *chronic*; it may be limited to the mucous surface, or it may extend to the more external coats, through the medium of the connecting cellular tissue; it may even affect only the mucous follicles of the canal, the internal membrane being either entirely exempt, or affected only in the immediate vicinity of the follicles.

16. *A.* Causes. — *a.* Œsophagitis is most frequent during infancy and childhood, but it is occasionally also observed during middle and advanced age. Long-continued and severe dyspepsia, constipation, the abuse of spirituous liquors, the habit of wearing too warm clothing around the neck and throat, the use of tightly-laced corsets, the strumous diathesis, and sanguine and plethoric habit of body, *predispose* to it.

17. *b.* The *exciting causes* are chiefly those physical agents which act directly upon the canal, and diseases of adjoining organs or parts which extend to it, either in their course, or upon their disappearance in their original seats. The former are draughts of cold fluids, or the ingestion of ices, whilst the body is overheated or perspiring; the deglutition of too large a mouthful, or of too warm fluids or substances; or of hard irritating bodies; the abuse or incautious use of irritating medicines, as iodine, squills, ammoniacum, ammonia, &c.; exposure of the neck and chest of females; the use of highly seasoned or spiced articles of food; the accidental or intentional ingestion of acrid or corrosive poisons, as the mineral acids, the bi-chloride of mercury, preparations of arsenic, &c.; acrid and septic animal poisons, particularly those developed in preserved or smoked meats, mushrooms, &c.; and the injudicious ex-

hibition of acrid emetics. Œsophagitis is often caused in young children, by sore nipples, and by an unhealthy state of the milk of nurses.

18. This disease may also occur upon the disappearance of cutaneous eruptions, or after the suppression of accustomed secretions and discharges. It may appear in the gouty or in the rheumatic diathesis, and thus assume a modified form; but it is very rarely a consequence of suppression or metastasis of either of these diseases. It most frequently occurs during the progress of some diseases, and as a sequela or extension of others, particularly of eruptive fevers, aphthæ, erysipelas, pertussis, inflammatory affections of the fauces and pharynx, and of the internal surface of the stomach.

19. Œsophagitis is, moreover, not only caused by, but also often *complicated* with, one or other of the foregoing diseases, particularly scarlatina, small-pox, erysipelas, aphthæ, gastric and mucous fevers, inflammation of the fauces and pharynx, or inflammation of the stomach. In nearly all these associations, the inflammation of the œsophagus is a consecutive affection; but, although arising from the extension of the inflammatory action, chiefly by continuity of surface, it is not the less important as respects its consequences. Inflammation of the internal surface of the œsophagus, may also be complicated with *spasm* of some part, or of the whole, of the canal. In this case, the irritability of the muscular coat of the tube is so inordinately increased, in consequence of the inflamed and sensible state of its mucous surface, that it becomes spasmodically and painfully contracted upon the passage of substances along it. The disease is also occasionally complicated with chronic laryngitis, this latter affection being consecutive upon the former. A case of this description lately came before me. The laryngeal affection, which, owing to the paroxysms of suffocation and cough accompanying it, was the prominent complaint, and attracted the chief attention, was removed after the treatment had been appropriately directed to the primary disease.

20. ii. SYMPTOMS. — *A. Of acute Œsophagitis.* — Pain in some form or other is always complained of, and is usually accompanied with a sensation of heat. It extends in general behind the trachea, from the middle of the throat to between the shoulders, and the ninth dorsal vertebra. This burning pain varies in degree, is sometimes chiefly felt about the bottom of the pharynx, and behind the glottis; at other times, behind the sternum and xyphoid cartilage; and is occasionally accompanied with the sensation of a foreign substance in one of the above situations. In some instances the pain is dull and slight, and in others attended by the feeling of a cord extending in the course of the canal. In all cases, the pain or uneasy sensation is greatly augmented by deglutition; so much so, on some occasions, that the patient either obstinately refuses to swallow, particularly liquids, or experiences an instant regurgitation of them. Sometimes, in the more acute cases, the matters thus thrown up are ejected forcibly through the nose; or irritate the glottis so as to occasion violent and suffocative fits of coughing. Independently of the regurgitation of matters attempted to be swallowed, there is frequently an expuition of a glairy fluid, secreted from the pharynx and upper part of the œsophagus. The patient is generally tormented with thirst and singultus. This latter symptom is seldom wanting when the lower part of the tube is inflamed. In this case, the more consistent substances which are swallowed are arrested by spasm of the inflamed part, occasioning great pain, generally referred to the space between the shoulder-blades, and are afterwards ejected or vomited, with a considerable quantity of mucus, sometimes streaked with blood.

21. In *children*, œsophagitis, in its more acute states, is not infrequent, particularly during infancy; and in them the diagnosis is difficult. The child generally refuses drink, or drinks little, cries, and regurgitates the ingesta. Hiccup is almost constant, and frequently vomiting, which does not often occur in the adult from this disease. When the milk is thrown up unchanged, we should always suspect the existence of inflammation of the œsophagus.

22. Besides the foregoing, there are also many of the usual signs of symptomatic fever, generally of the inflammatory type, but frequently of a remittent form. The tongue is red at its point and edges, sometimes throughout; at other times it is loaded and furred in the middle and base. The fauces are red and injected, or natural; the uvula is generally relaxed. The bowels are confined; the urine scanty and high-coloured.

23. iii. TERMINATIONS. — *Acute inflammation* of the œsophagus may terminate — (*a*), in resolution — (*b*), in suppuration — (*c*), in softening of the coats of the canal, or — (*d*), in gangrene, or — (*e*), it may pass into a chronic state of disease. — *A. Resolution* takes place generally with a gradual subsidence of the acute symptoms, and a more copious discharge of mucous or muco-purulent fluid; or with critical evacuations, as hypostatic urine, copious perspiration, &c.; it occurs chiefly on the fifth, seventh, ninth, or eleventh day; and occasionally with the exudation of an albuminous substance, the discharge of which disposes to a resolution of the inflammatory action. This substance is secreted on the internal surface of the tube, as in croup, forming a false membrane, sometimes extending upwards to the pharynx and fauces. As the inflammation subsides, this false membrane is thrown off from the mucous surface, the secretion of the mucous follicles gradually detaching it from its adhesions to this surface, and it is passed with the ingesta into the stomach.

24. *B. Suppuration* sometimes occurs in one or other of two forms. — 1st. The purulent matter may be discharged, in consequence of violent inflammation, from the whole internal surface of the tube. This, however, seldom takes place unless œsophagitis is occasioned by very irritating ingesta. I was called some years ago to a case of this description by a practitioner in Westminster. The patient, a robust young man, had attempted to poison himself with laudanum. In order to procure the evacuation of the poison, a considerable quantity of mustard mixed with warm water was exhibited. This produced full vomiting, after the other means had failed. Inflammation of the œsophagus, however, in its most distressing form supervened, and in the course of two or three days was followed by a most copious and entirely purulent discharge regurgitated from the œsophagus. The quantity discharged be-

tween each visit, and collected in the vessel, was surprising. He, nevertheless, recovered, and without any affection of the nervous system, as is often observed after poisoning from opium. — 2d. *Suppuration* more commonly occurs when the inflammation attacks a part only of the tube, and implicates all its coats. A distinct abscess usually forms in this case, most frequently in the cellular tissue connecting the mucous with the muscular coat. It occurs in neglected cases of the disease, and in scrofulous habits; and is generally indicated by the complete stop put to deglutition, by great thirst, excessive pain, and by a sense of fulness, and of pulsation in the situation of the œsophagus. In most of the cases on record the abscess has burst into the canal, either spontaneously upon efforts at deglutition or vomiting, or upon introducing a bougie or probang along the passage; and the patient has obtained instant relief. Interesting cases of this description have been published by M. BOURGUET (*Gazette de Santé*, 1823, p. 221.), and by M. BARRAS (*Archives Gen. de Méd.*, t. x. p. 134.). Recovery generally takes place rapidly after the matter is discharged; — it either passes into the stomach, or is ejected upwards.

25. *C. Gangrene* occasionally terminates in inflammation of the œsophagus, but not so often as is stated by some writers. It occurs chiefly after œsophagitis complicating scarlatina, or following that disease, in which circumstances I have observed it on several occasions, generally, however, associated with gangrenous *pharyngitis*. I have, likewise, seen it after œsophagitis caused by poisonous ingesta, particularly the animal poison generated in preserved or spoilt meats. Although it may commence previously to dissolution, yet the morbid appearances usually described as constituting this change are somewhat increased after death. When the inflammation terminates, the sphacelus is chiefly confined to the internal surface of the tube, which presents more or less, along its whole extent, soft, tumified patches, of an irregular form, of a dark grey or slate colour, and emitting a peculiar fœtid odour.

26. The *symptoms* indicating this change during the life of the patient are not always manifest. Two cases of this mode of termination, occurring independently of poisoning, and of complication with scarlatina, have come before me in practice, and were recognised during life, and verified by an examination after death. The one occurred in a child, the other in an aged female. In both, great tumefaction and tenderness of the lateral and anterior parts of the neck; a deeply encrusted tongue, with a dark sordes; a feeble, small, unequal and intermittent pulse; singultus, and frequent fœtid eructations; great prostration of strength, with leipothymia, and cold clammy perspirations, were remarked. There was no vomiting; but in one of the cases a small quantity of an offensive sanguineous mucus was occasionally regurgitated upwards shortly before death.

27. *D.* The *changes of structure* most commonly observed in fatal cases of acute œsophagitis are injections in patches, striæ, or generally, of the mucous surface, with partial destruction of its epithelium, particularly in infants. This surface is usually reddened, the tint, however, varying from a rose-hue to a reddish-brown. The mucous membrane is commonly tumified, its subjacent cellular tissue thickened, injected, infiltrated with a serous or sero-puriform or sanguineous fluid, and both the one and the other softened and more easily torn than natural. Sometimes they are reduced to a nearly pulpy state, and are of a reddish-brown, or purple colour. The sub-mucous cellular tissue sometimes presents minute collections of a puriform matter which elevate the internal surface into pustular eminences. The whole parietes of the canal are softened, sometimes œdematous, injected with blood and more lacerable than usual. In rare cases, purulent collections form exteriorly to the muscular coat. Ulceration seldom occurs after this state of inflammation: it is more frequently met with after that hereafter to be described. When, however, it does occur, the ulcerated part generally varies in size and in depth; the parts in its immediate vicinity being very much softened, inflamed, and somewhat thickened or tumified.

28. *E.* The changes produced in the œsophagus after the ingestion of strong acids are generally of a disorganising nature in the more rapidly fatal cases. The mucous surface is eroded and of a brownish, or brownish-black hue, and the tube generally more or less constricted. The erosion or partial solution of the internal surface sometimes extends to the connecting cellular tissue, so that the muscular coat may be readily denuded, as by rubbing a sponge firmly along the exposed surface.

29. iv. SUB-ACUTE AND CHRONIC ŒSOPHAGITIS. — *A.* The less active forms of the disease are more frequent than the acute. They may take place primarily, or they may be the consequences of neglected, or partially subdued, states of acute œsophagitis. Many of the slighter cases that have occurred primarily never come before the physician until organic changes seriously interrupting the process of deglutition have taken place. — *a.* The slight or chronic states of œsophagitis are characterised chiefly by the same symptoms as characterise the acute form (§ 20.), but in a milder degree — by soreness and tightness under the sternum or between the scapulæ, the discharge of a ropy fluid, or acrid eructations, sometimes rumination after a full meal, by a hawking or short cough, or frequently hawking or spitting, by a weak irritable pulse and emaciation; and sometimes by obstinate dyspepsia and costiveness.

30. *b.* The chronic states of the disease are generally *caused* by previous disorders, particularly by inflammatory or neglected dyspepsia, inflammations of the internal surface of the stomach, by eruptive fevers and inflammation of the fauces or pharynx; by the acute states of the disease, and by the causes producing these states.

31. *c.* The milder or more chronic states of œsophagitis *terminate* in resolution, or in some one or more of the organic lesions described in another section of this article, or in *thickening* and *induration* of the parietes of the canal, generally with some degree of *stricture*, and in ulceration.

32. *B.* THICKENING AND INDURATION of the parietes of the œsophagus sometimes take place after repeated attacks of inflammation; but generally after chronic inflammation, occurring either in its primary form, or consecutively on the acute state. Thickening of the parietes is usually accompanied

with narrowing of the passage, forming permanent stricture or obstacle to the passage of the ingesta into the stomach. This change may affect the whole of the canal in a greater or less degree, or it may be limited to any one part of it.—*a*. The circumstances which especially favour this *termination* are, inefficient modes of cure; the taking of stimulating food too soon after the acute stage of disease has been subdued; the injudicious use of astringent and tonic medicines, particularly gargles, which have been suggested by the state of the fauces and uvula that I have described as frequently accompanying the different states of the disease; and the strumous diathesis. But I believe that the most frequent cause of this lesion is the use of ardent spirits, as has been proved by the observations of MICHAËLIS (HUFELAND *und* HIMLY, *Journ. der Pr. Heilkunde*, 1812, p. 52.). This state constitutes the *permanent organic stricture* of Dr. MONRO, and is ably illustrated in his work on the morbid anatomy of the digestive tube.

33. *b*. The *symptoms* of thickening of the parietes, with stricture, of the œsophagus, are the continuance of dysphagia after the decline of the more acute symptoms; dyspnœa, obscure pain, soreness, and a sense of tightness in the course of the œsophagus; sometimes the discharge of a very tenacious mucus; impaired digestion, despondency, costiveness; and febrile exacerbations. In some cases, a gurgling sound is heard upon attempts at swallowing fluids, and a portion of them is regurgitated, exciting a choking cough. The deglutition of more solid substances is slow, difficult, and painful. The patient often feels the substance lodged some time in the canal; and, afterwards, as if forcibly thrust through a narrowed passage. When the stricture is seated low in the canal the portion above it is often very much dilated, forming a sac in which the ingesta lodge, and whence they are afterwards partly regurgitated and partly pass into the stomach. In *thickening* of the parietes of the œsophagus and *permanent stricture*, fluid substances are more readily swallowed than those possessed of some degree of consistence; whilst in *spasm* of the œsophagus, fluids pass with greater difficulty and distress to the patient.

34. *c*. *Permanent stricture* of the œsophagus, although generally resulting from inflammatory action of the kind now described, may occasionally also proceed from a different cause. It may, although rarely, arise from *scirrhous degeneration*, or from tumours of a *fibro-cartilaginous* nature developed in the parietes of the tube. I believe, however, that a great proportion of the cases which have been said to be *scirrhus* of the œsophagus, have been only the simple thickening and induration resulting from chronic inflammation. Permanent stricture of this passage may also result from the enlargement of, and pressure upon the tube, occasioned by a cluster of enlarged lymphatic glands. This is, however, a rare occurrence, and is chiefly met with in childhood and early life, in those of a strumous diathesis, and in whom the submaxillary, and other superficial glands, are tumified; whilst scirrhous degeneration occurs at an advanced age, and is attended by appearances of the scirrhous cachexia. The dysphagia arising from the pressure of tumours exterior to the tube is seldom or ever so urgent as that which depends upon narrowing of the passage from change of the parietes themselves. The pressure on the œsophagus produced by aneurism of the aorta, even shortly before its opening into this canal, seldom occasions very marked difficulty of deglutition. This distinction has been judiciously remarked by MONDIÈRE, and is based on the cases recorded by MM. BERTIN, LAENNEC, BOUILLAUD, RAIKEM, OUVRARD, and others. This canal may also be partially obliterated from increased thickening — a hypertrophy of the mucous membrane itself, which is also as if puckered or drawn together. In the majority, however, of such cases, there is permanent constriction also of the circular muscular fibres of the part affected.

35. *Permanent stricture* of the œsophagus, whether proceeding from inflammatory thickening and induration of its coats, from scirrhous or other formations, or tumours developed in the parietes of, or external to the tube, may be seated in any part of the tube, either at its commencement in the pharynx, or in any intermediate portion between this and its termination at the cardia. Sir E. HOME thinks that it occurs most commonly in the former situation; but, although this may perhaps be, upon the whole, the part most frequently affected, the other parts are also not unfrequently the seat of this change. It is, however, generally remarked that, even when the disease is confined to the lower portion of the tube, many of the more urgent symptoms are often referred to the lower part of the pharynx and top of the œsophagus.

36. *d*. *The Diagnosis of permanent Stricture of the Œsophagus* is sometimes difficult. This lesion may be confounded with spasm of the tube, with inflammation of the internal surface of the canal, with disease of the cardiac orifice of the stomach, or even with affections of the larynx and trachea: or these maladies may be mistaken for stricture of this tube. The permanence of the symptoms, generally attributed to this stricture, would serve to establish the existence of it in doubtful cases; if such permanence were always observed, but HEINEKEN, LEROUX, and others have noticed marked remissions in the symptoms of cases of this lesion. In these cases, the exacerbations have been owing to more or less of spasm attending the permanent stricture. Indeed, when difficulty of deglutition occurs in any of the diseases just mentioned as simulating permanent stricture of the gullet, it is generally owing to spasm. In some diseases of the larynx, or of the stomach, spasm may occur in the gullet, as in the case recorded by Mr. SHAW (*Lond. Med. & Phys. Journ.*, vol. xlviii. p. 185.). When difficult deglutition is observed in affections of the stomach, or of adjoining parts, and even in consequence of tumours in the vicinity of the tube, it generally is either owing to, or aggravated by, flatus rising into this canal from the stomach, the flatus occasioning both obstruction to the descent of the matters swallowed, and spasm in parts of the tube. The chief diagnosis, therefore, between permanent stricture of the gullet, and other affections, is thus actually between the former and spasm of the parietes of the tube. Permanent stricture is generally consequent upon inflammation, and is slowly and gradually progressive, until deglutition is impossible. When it is far advanced, the difficulty of swallowing is more or less permanent, although exacerbations are remarked in some cases. The

difficult deglutition which is occasioned by spasm, and is sometimes caused by disease of adjoining parts, occurs chiefly in hysterical and hypochondriacal persons, and in nervous and delicate constitutions. When the difficulty is caused by the pressure of scrofulous or enlarged lymphatic glands, this circumstance is generally rendered apparent by the state of the neck and throat, and by the appearances and sounds in percussion, near the top of the sternum and sternal ends of the clavicles.

37. *C.* Ulceration of the œsophagus may occur in consequence of inflammation of its internal surface, in one of two forms; namely, ulceration commencing in the mucous follicles, and ulceration of the mucous and sub-mucous cellular tissue unconnected with change of the state of those glands.—*a.* It has been considered doubtful whether or no the ulceration, which is seated in, and proceeds from a particular change of, the follicles, is actually a consequence of inflammation. It is very probable that obstruction of those glands may give origin to ulceration, and that the inflammatory irritation either preceding or accompanying the ulcerative process may be very slight — and possibly of an unhealthy description. I believe, from several instances which have occurred to me amongst children, that such is the case, and that neither the local appearances nor their causes, nor the attendant circumstances and phenomena, are such as mark sthenic action, or energetic vital endowment. This form of ulceration was first noticed by Brunner (*De Glandulis Duodeni*, cap. 10. p. 136.), as occurring in the œsophagus; and I believe that it occasionally proceeds to perforation of the tube, and affects most frequently its lower part, whilst the next form of ulceration is more commonly found in its upper portion.

38. *b.* Ulceration which takes place independently of the follicles, I consider to be more decidedly a result of inflammatory action, than the foregoing variety. The procession of phenomena in cases of this description appears to be the following: — The inflammation of the mucous surface often implicates more or less of its subjacent cellular tissue, and a serous or sero-puriform fluid is effused in distinct points, elevating, in the form of pustules or minute blisters, the mucous tissue, the detached portions of which lose their vitality and separate, leaving an excoriated or ulcerated spot, which extends in width and depth, according to the habit and temperament of the patient, to the cause in which the disease originated, and to the treatment employed. Ulcerations of this description, as well as the preceding, are most commonly met with among infants and young subjects, and are frequently connected in them with softening of the coats of the tube. When ulceration occurs in adult subjects or in persons advanced in life, it is generally accompanied with, if not consequent upon, either thickening or narrowing of the parietes of the œsophagus, or both; and it is usually seated in the part above the constriction, excepting in scirrhus of the tube, when the narrowed portion itself often becomes ulcerated, and in this case carcinomatous. But it sometimes is met with independently of either thickening or induration of the parietes of the tube. Ulceration from inflammation of the internal coats of the œsophagus is very seldom seated in several different parts of its surface in the same case — the ulcers of this description being never so numerous as those commencing in the follicles, and rarely exceeding one or two. This kind of ulcer most frequently attacks the upper portion of the canal and extends from three to eight or nine lines in width. M. Scoutetten met with a case, in which the ulcer was twelve lines in diameter and had destroyed all the coats of the posterior part of the tube, and had even laid bare the anterior part of one of the vertebræ. Generally, when the ulcer is large, one only is found. Sir Everard Home thinks that the posterior part, or that applied to the vertebræ, is more usually the seat of ulceration; but this is not satisfactorily shown. There can be no doubt that this form of ulceration occurs more frequently in the upper part of the tube, whilst the ulceration which originates in the follicular glands is more usually found at its lower part, and is more generally consequent upon eruptive fevers and febrile diseases, particularly those characterised by depressed energies of life. Ulceration of the œsophagus may occasion ulterior effects of a very important character, previous to its usual termination in death. A case, to which I shall more particularly allude, occurred to me where it occasioned a fatal hæmorrhage. And Dr. Monro mentions a case where the ulcer penetrated the trachea, and occasioned death, by the escape of matter from the œsophagus into the trachea. A similar case I have already noticed as having occurred to Zeviani, and another has been seen by myself. *Rupture*, as well as *perforation* of this tube may also be occasioned by ulceration.

39. *c. Symptoms.*—When the ulceration is seated in the anterior and superior portion of the œsophagus, posterior to the larynx and trachea, many of the symptoms of laryngitis and tracheitis are observed. An interesting case of this description is recorded by Paletta (*Exercitat. Patholog.*, p. 228.). Ulcers in the œsophagus are generally accompanied with many of the symptoms which attend simple inflammation of this tube. The pains, however, are usually more acute, particularly upon deglutition; sometimes there is vomiting of a glairy matter, generally streaked or coloured with blood. Solid substances are swallowed with difficulty, but fluids, when taken in considerable quantity, pass with more ease. Salivation often occurs during the last stage of the disease. M. Mondière mentions a case, in which a large ulcer of the œsophagus was seated near the cardia, and where the patient, during the four months he was under treatment, complained of a burning sensation at the superior part of the epigastric region. This patient frequently rejected rounded and purulent matter, a symptom noticed both by Paletta and Leroux. In some rare cases, the ulceration may give rise to sudden death from hæmorrhage. A case of this description occurred to me a few years ago in an aged female, who had been under my care for several years for disorders of the digestive organs, accompanied with psoriasis. A few days previous to her death she was affected with œsophagitis complicated with pharyngitis, and attended by a constant hacking cough, and great depression of the powers of life. I was suddenly called to her about the eighth or ninth day of the attack for sudden and profuse discharge of blood, which was described as having been ejected upwards without

evident effort; but, before I reached her, she had expired. The quantity of blood thus discharged was very considerable. Upon examination, the stomach contained about a pint and a half of blood partly coagulated, and its coats, particularly the mucous coat, were considerably softened. The pharynx was of a dark colour, in patches, some of which were of a purplish tint. In the upper third of the œsophagus, towards its anterior parietes, upon the left side, was a large irregular ulcer, which had destroyed, in some points, the muscular coat, and in all, the mucous and submucous tissue. The internal surface of this part of the tube, particularly around the ulcer, was of purple hue, tumified, soft, and easily torn. The bottom of the ulcer was of a deep red colour, and the subjacent parts red, vascular, and injected. The hæmorrhage had most probably arisen from erosion, by ulceration of some of the small vessels.

40. Ulceration, perforation, and rupture, in consequence of ulceration of the parietes of the œsophagus, are generally followed by death with more or less rapidity; and, until shortly before death, the patient may not have come under treatment, either from the slightness or neglect of the symptoms. Instances have even occurred in which sudden death has taken place, the patient not having had recourse to medical advice, and, upon dissection, a large perforating ulcer has been found in some part of the tube. In a case of this kind, which I saw, the ulcer was seated a little above the cardia.

41. *Scirrhous ulceration*, or *carcinoma* of the œsophagus, most frequently occurs either at the upper or the lower extremity, more frequently extending from either the pharynx or the cardiac orifice of the stomach, than affecting the tube primarily. It rarely or never appears without being attended by the lancinating and burning pains, and the carcinomatous cachexia, characteristic of this disease.

42. *d. The prognosis of inflammation and permanent stricture* of the gullet should necessarily depend upon the causes, progress, complications, and severity of the disease. *Acute* and *sub-acute œsophagitis*, in which the prognosis is generally more favourable, than in the chronic state of the malady and in permanent stricture, should be viewed as a most serious disease, as respects either its more immediate results, or its contingent consequences; and it is still more so, when it occurs in cachectic habits and in the course of exanthematous and continued fevers. When it is caused by powerful stimulants or irritants calculated to produce a local effect merely, without directly disorganising the parts or remarkably depressing the vital power, it is generally removed by appropriate means; but when it is caused by agents which occasion these injurious effects, and which even extend them thence to adjoining parts, the prognosis should be very unfavourable. When the symptoms indicate the passage of the *acute* or *sub-acute* into the *chronic disease*, a cautious if not an unfavourable opinion ought to be formed of it; and, when they indicate the supervention of *stricture*, or of *ulceration* with or without stricture, the prognosis should be very unfavourable, although the result may be long delayed. The history of the case, the previous health and present state of the patient, and the effects of treatment, ought always to be duly estimated in the opinion which is to be formed as to the result.

43. v. TREATMENT. — *A. Of acute Œsophagitis.* — *a.* General and local *bleeding* is indispensable in this state of the disease. Bleeding from the arm should never be neglected; and afterwards local depletion may be employed, either by leeches or by cupping. In œsophagitis, the local blood-letting recommended by CŒLIUS AURELIANUS, viz. the opening of the sub-lingual vein, may be practised. It has received the sanction of the greatest, even in the present day, of practical authorities, that of HOFFMANN, as well as of JANSON and others. HILDENBRAND recommends the application of leeches, in preference to cupping: in children, either or both may be employed according to circumstances. When the local depletion is directed to the throat, leeches are certainly preferable. Next to depletion, as perfect inaction of the tube as possible should be enforced. The patient should be deprived of all ingesta, excepting cooling fluids, which may be used merely to moisten the mouth and throat, without attempting to swallow them. After the acute symptoms are removed, and the necessity of having recourse to light nourishment is urgent, the blandest and most mucilaginous substances, in a semifluid form, and of the temperature of the blood, may be taken. The patient should at the same time be kept quiet, not be allowed to talk, and have the bowels freely evacuated by cathartic enemata, which, while they procure the evacuation of accumulated and hurtful matters, may occasion a derivation of the circulating fluid to the lower part of the digestive tube. In the slighter forms of œsophagitis these means, even without any considerable depletion, will be often sufficient to remove the disease.

44. *b.* When it is necessary to exhibit medicines by the mouth, particularly those of a purgative nature, my experience leads me to prefer a full dose of calomel, either alone or combined with James's powder, exhibited in a semi-consistent substance. The advantages resulting from the use of calomel are that it diminishes vascular action in the part to which it is immediately applied, whilst it occasions vascular derivation to the lower part of the intestinal canal. It may be mixed in some sweet butter, which should be allowed to melt gradually and pass insensibly along the œsophagus; the mouth being guarded by subsequent ablution. When it is necessary to act decidedly on the bowels, and yet prevent the increase of thirst — one of the most distressing symptoms of the disease — the supertartrate of potash, with a fourth part of the sub-borate of soda, given in the form of electuary and combined with confection of senna, and the inspissated juice of elder-berries, is one of the best means that can be employed. If the inflammation be attended with much spasm of the tube, or if an irritable state of it still continue after depletions, or if the morbid action be apparently still unsubdued, the hydrochlorate of ammonia or nitre should be prescribed in the form of linctus or mixture with mucilages, syrups and anodynes, in frequent doses; and these, swallowed gradually and often, will generally afford marked relief. When the upper part of the tube is affected, some benefit may be procured from the use of emollient fo-

mentations and poultices to the throat, particularly after the application of leeches to the part.

45. *c. Revulsive* or *derivative means* are sometimes of service, especially when they follow, as they always should, vascular depletions carried as far as the state of the case may require. Revulsions ought to be prescribed in a decided manner; for, in order to be beneficial, the artificial irritation should surpass in degree that which it is intended to supersede. The irritation of blisters whilst inflammatory action remains unsubdued will often chiefly tend to increase febrile commotion, and thereby to augment the local excitement. As to the means of derivation and the situation of applying them, opinions are various. Bleuland recommends blisters and moxas to be applied between the shoulders. Many prefer sinapisms and irritating pediluvia. The turpentine embrocation or epithem applied to the throat and sternum, or between the shoulders, or a mustard poultice in the same situations, are the most decided and the most rapid in their effects. Either of these may be used for children; but blisters ought not to be applied to them for a longer period than three or four hours, when a warm bread and water poultice should replace them.

46. *d.* Œsophagitis, in various degrees of activity is not infrequent in *children*, but it is often complicated with inflammation of the fauces and pharynx, or with bronchitis, or with inflammation of the villous surface of the stomach; and is generally seated in the mucous membrane, seldom extending deeper than the sub-mucous tissue. In them also the mucous follicles are often chiefly implicated. The local affection is, moreover, often associated with weak vital power, and sometimes with general cachexia — circumstances which require a very modified practice. After active inflammatory action has been subdued by depletion, or independently of depletion, in this latter class of cases, I have derived much advantage, particularly in the complications now alluded to, from the hydrochlorate of ammonia, or the subborate of soda given in honey, or in the inspissated juice of elder-berries and syrup of marsh-mallows, or of roses.

47. *e.* Œsophagitis *complicated* with the inflammations just mentioned, requires very nearly the same treatment and regimen as above recommended. But when it supervenes in the course of eruptive or continued fevers, very different means are necessary, and particularly when those fevers acquire an asthenic or malignant character. I have seen several cases of this description in children and young persons, and have never obtained in them any advantage from vascular depletion, except from a cautious recourse in some cases to local depletion. The mineral acids, particularly the muriatic, camphor, the pyroligneous acid with camphor, the boracic acid, and sub-borate of soda, small doses of the sulphate of zinc, or of the sulphate of quina in confection of roses; the solution of the acetate of ammonia with camphor mixture and the decoction of marshmallows; the hydrochlorate of ammonia or the nitrate of potass in the syrup of roses, &c., are severally beneficial in these associations of the disease. When œsophagitis is complicated with pharyngitis, as observed in the more malignant states of scarlatina, or in other exanthematous and continued fevers, the sulphate of quinine, the preparations of cinchona with camphor or the mineral acids, particularly the hydrochloric; or the decoction of bark with the chlorate of potash; or small doses of the chloride of lime in honey or syrup, may be prescribed; the derivative means above noticed (§ 45.) being also employed.

48. *B. The sub-acute and chronic states of œsophagitis* require similar means to the above, but in a less active form. In these, local depletions are often required, and they may be repeated according to circumstances. Purgatives are generally also necessary. The frequent use of refrigerant, demulcent, and soothing linctuses and mixtures, as almond emulsion or syrup of marshmallows with hydrocyanic acid, or the mucilages and syrups with sal ammoniac or nitre, should not be neglected. In some cases of the chronic, as well as of the acute, form of the disease, calomel or the grey powder may be mixed with a little fresh butter, and placed upon the tongue. As this melts, and is gradually and slowly swallowed, a healing effect is produced by it upon the inflamed surface. When there is reason to infer the existence of ulceration, this is often of service. If the bowels require further aid, enemata should be administered. Advantage will often accrue from the more permanent derivatives, as blisters frequently repeated, or kept open and freely discharging, and pustulation by means of the tartarised antimonial ointment, or of croton oil, rubbed in the situations about to be mentioned. In the more obstinate cases, moxas may be applied, or an issue made near the top of the sternum, or a seton inserted in the nape of the neck.

49. For *permanent stricture* (§ 34.), as well as for *ulceration* (§ 37.) *of the œsophagus*, the same means as have been advised for chronic œsophagitis may be employed. If these fail, after having been fully and appropriately tried, surgical aid should be obtained, and *dilatation* or *cauterization* be had recourse to. But of these and other surgical measures it is not my duty to treat.

III. Hæmorrhage from the Œsophagus. — Syn: *Œsophagorrhagia; Blutung aus der Speichelröhre*, Germ.

Classif. — *See art.* Hæmorrhage.

50. Hæmorrhage very rarely takes place from the œsophagus, unless from mechanical injury. When occurring spontaneously the source of the hæmorrhage is ascertained with great difficulty during the life of the patient. Blood effused from the internal surface of this tube is seldom excreted directly upwards, but generally passes almost insensibly into the stomach, where it is partially digested and carried with the other ingesta into the intestines, if it be in small quantity, or is *vomited*, if the effusion be very considerable. In this latter case, hæmorrhage from the œsophagus simulates Hæmorrhage *from the stomach* (*which see*). The chief circumstances which lead us to suspect, when blood is discharged upwards in any way, that it is effused from the internal surface of the œsophagus, are the symptoms of previous disease of this part, especially pain and heat in the course of the canal, with difficulty of, and increased pain on, deglutition; and a sense of heat and titillation behind the trachea, in the situation of the tube. Hæmorrhage seldom or never occurs in this part of the digestive canal, unless from pre-existing disease of a severe character, as inflammation terminating in ulceration, a case of which I have had an op-

portunity of observing; or from the presence of a foreign body lodged in the canal, circumstances tending to facilitate the diagnosis; but without which, it will be difficult to determine whether or no the hæmorrhage proceeds from the stomach, or even from the respiratory organs. The phenomenon already alluded to is calculated to confound it with hæmatemesis, whilst the cough, which frequently accompanies disease of the œsophagus, particularly when seated in its upper portion, is likely to mislead us, and to suggest its origin in pulmonary disease.

51. *Treatment.* — When the source of the effusion is tolerably manifest, the treatment differs but little from that which is indicated in hæmorrhages from other parts. It should have reference to the states of vital power and of vascular tone. Œsophageal hæmorrhage very rarely occurs under circumstances requiring general or even local blood-letting. The application of cold externally — as a stream of cold water poured on the throat; the use of ices, as the lemon ice, or of acids and other astringents internally, particularly in the form of linctus or electuary, or in any semi-fluid vehicle, are means which should never be overlooked. The most certain remedy, however, in these cases, is the spirits of turpentine mixed with honey or the yolk of an egg, and taken in repeated doses. In addition to these, hot pediluvia, cathartic enemata, sinapisms, blisters, and other derivatives, may be prescribed. As hæmorrhage from this part is generally consequent upon *chronic œsophagitis* and *ulceration*, the same treatment as already recommended for these diseases (§ 48. *et seq.*) should generally be instituted after the effusion has been arrested.

IV. SPASM OF THE ŒSOPHAGUS. — SYN. *Spasmodic stricture of the œsophagus. Œsophagospasmus; der Speiseröhrenkrampf*, Germ. *Œsophagisme*, Fr.

CLASSIF. — II. CLASS. I. ORDER (*Author*).

52. DEFIN. — *Difficult and painful deglutition, occurring either suddenly, and without evidence of previous disease of the œsophagus, or as a symptom of such disease, and of several nervous affections.*

53. This affection has attracted but little attention, although the justly celebrated HOFFMANN wrote a treatise on it (*De Spasmo Gulæ Inferioris*, Halæ, 1733.). It is, I suspect, in its slighter forms, more frequently brought before the physician than recognised by him. It forms a most distressing part of the series of morbid phenomena attending rabies, tetanus, hysteria, and hypochondriasis; and it constitutes the form of dysphagia which is sometimes met with in delicate and nervous females, particularly those in whom the uterine functions are disordered, or the uterus itself in an irritable and slightly inflamed or congested state.

54. i. CAUSES. — The circumstances just alluded to may be viewed as *predisposing causes* of this affection. It may also be considered as occasionally appearing hereditarily, particularly in connection with the nervous temperament, and delicate and hysterical constitution. — The most common *exciting causes* are swallowing cold fluids when the body is perspiring; fits of anger or passion in nervous or irritable persons; the irritation occasioned by the ingestion of acrid, unwholesome, and injurious substances; and flatus rising into the canal and causing spasm of one part and dilatation of another part adjoining the former, particularly upon attempts at deglutition. Owing to this last cause, temporary spasm of the œsophagus is not an infrequent occurrence during the course of dyspeptic, hysterical, asthmatic, and hypochondriacal affections. Indeed, the dysphagia otfen attending the slight or imperfectly developed form of hysteria, consisting chiefly of the globus, or of borborygmi, is entirely owing to œsophageal spasm — or rather, this spasm is chiefly the cause of these phenomena, especially when a portion of the tube is distended by flatus. That spasm of this tube is often *symptomatic* of inflammations or irritations of the stomach, and of the uterus and ovaria, is fully established. HOFFMANN states that it is often attendant upon inflammation of the upper portion of the spinal marrow. It has also been caused by inanition, by worms rising into the canal from the stomach, by sea-sickness, by excessive retchings or vomitings, by menstrual or uterine irregularities, and even by powerful mental emotions, particularly those of a depressing kind. It forms a most distressing symptom of rabies, and is a chief cause of the distress which attempts at deglutition occasion in that malady; although spasm of the pharynx is also present in that as well as in some other diseases in which it is a prominent phenomenon. Œsophageal spasm is occasionally caused by the influence of the imagination, as shown by impossible deglutition, or the forcible regurgitation of a substance through the mouth or nose, when disgust is conceived against it, and by attempts to take disagreeable medicines by children or even grown-up persons. GRAPENGEISSER says that he has seen this spasm produced by electricity. It has already been stated (§§ 19, 20.) that it heightens the distress in cases of acute, sub-acute, and chronic œsophagitis.

55. ii. The SYMPTOMS *of œsophageal spasm* are chiefly the sudden occurrence, without previous disorder referable to the œsophagus, of difficult or even impossible deglutition, and pains excited by attempts to swallow that are felt in some portion of the tube. The symptoms vary with the part of it affected. When the spasm is seated at the top of the œsophagus and pharynx, then deglutition is almost or altogether impossible, and substances are forcibly rejected. When it is seated in the lower portion, then the morsel swallowed is arrested at its seat, and is either immediately regurgitated, or remains there for a considerable period, when it slowly passes into the stomach, or is violently ejected from the canal. If the spasm be attended, or is caused, by flatulent distension of a portion or portions of the tube, attempts to swallow are often very painful, difficult, or even choking; but the distress is relieved, or entirely removed, by eructations of flatus, the dysphagia occurring only at the commencement of eating, although it sometimes only occurs towards the close. In some instances the most urgent distress is produced by the retention of the substances swallowed in the œsophagus, attempts to pass them into the stomach or to reject them being equally unavailing. I have seen this occurrence connected with the presence of flatus in the tube.

56. The nature, consistence, fluidity, and temperature of the substances taken often influence, or aggravate, or alleviate the symptoms, but in no uniform or definite manner. In some cases, fluid or warm substances are most easily swallowed, in

others consistent or pulpy, or semifluid, or cold food.

57. The *duration* of this affection varies with its causes, and with the disorders of which it is a symptom, or with which it is associated. It may be hence of very short continuance, and may not again recur; but where it has once appeared it generally returns after irregular intervals, or upon the recurrence of its causes. When symptomatic of, or associated with, any of the disorders above alluded to, it is very prone to recur as long as they exist, although it may be removed for a time, or prevented from recurring, by attention to diet and by treatment. Fear of its occurrence often assists in occasioning an attack, as well as in aggravating its severity.

58. iii. Treatment.—The cure of this affection, which, as above shown, is most frequently symptomatic, must necessarily depend upon the nature of its pathological cause and relations. When it seems to arise from inflammatory irritation in the œsophagus itself, the means advised for acute and chronic œsophagus (§§ 43. 48.) should be employed. If it appear to proceed from irritation and debility of the stomach, as frequently is the case, particularly when it is attended by flatus, the treatment recommended for the more inflammatory states of indigestion (*see* that Article) is appropriate. When it accompanies other hysterical phenomena, or inflammatory irritation, or congestion of the uterus or ovaria, or irregularities of the catamenia, the means prescribed for those affections (see Hysteria, Menstruation, Ovaria, and Uterus) should be prescribed.

59. In most instances, however, whether idiopathic or symptomatic, means directed to the affection itself should be employed, linctuses or demulcent mixtures, containing a combination of narcotics or anodynes with antispasmodics, as the syrup of poppies or the compound tincture of camphor with small doses of borax, or of nitre, or of the hydrochlorate of ammonia; the hydrocyanic acid, or the extract of belladonna in mucilage and the syrup of orange-peel; or the bitter infusions with these, or with the preparations of henbane or hemlock. At the same time, a belladonna or camphor plaster, or a plaster containing both these substances, may be applied to the throat and upper part of the sternum. A portion of the following embrocation, sprinkled on warm flannel and applied to these parts, is the most immediately efficacious of all other applications that I have employed.

No. 306. ℞ Linimenti Camphoræ Co., Linimenti Terebinthinæ, āā ℥jss.; Tinct. Opii ʒvj. (vel Extr. Belladonnæ ʒss.); Olei Cajuputi ʒj. M. Fiat Embrocatio.

60. Having removed the affection by these or similar means, the return of it should be prevented by a treatment directed to the disorder of which it is frequently a symptom. If it proceed chiefly from chronic debility and nervous susceptibility, tonics and antispasmodics, with generous diet, pure air, and regular exercise, should be enforced. If it arise from an irritable or torpid and weakened state of the digestive organs, stomachic aperients, tonics, antispasmodic and purgative enemata, &c. ought to be given. If it be caused by functional, or congestive, or inflammatory, states of the female organs, or menstrual irregularities, the remedies recommended for the removal of these states, especially antispasmodics, emmenagogues, chalybeate preparations, pure air, regular exercise, and chalybeate or alkaline mineral waters, should be prescribed. In cases of frequent recurrence of œsophageal spasm, particularly when it is connected with hysteria, much advantage will be procured from chewing a piece of camphor, or from holding a piece of it in the mouth, so that the saliva is imbued with it. In these cases, also, as well as in others, the various kinds of ices, or even iced waters, will be found most useful palliatives.

V. Paralysis of the Œsophagus.—*Palsy of the Gullet*, Monro.

Classif.—*See art.* Paralysis.

61. Dr. Monro remarks that there are various degrees of palsy of the gullet, and that in many diseases accompanied by great debility, a teaspoonful cannot be swallowed whilst the contents of a larger spoon readily pass down. The loss of power of deglutition is sudden in some cases and slow in others. In many a difficulty of swallowing solids only is perceived at first; and often the effort of deglutition is attended by much agitation of the frame, amounting in some instances to convulsion. The throat exhibits nothing uncommon, excepting paleness and flaccidity of the uvula and fauces. When difficult or impossible deglutition depends upon palsy, it is persistent or continued; and the easy passage of a probang into the stomach shows that it is not owing to any mechanical obstruction. Palsy of the œsophagus is generally associated with palsy of some other part or parts; palsy of it alone being extremely rare. I have seen palsy of this tube associated with palsy of the pharynx and of the muscles of articulation, no other part being paralysed, in three or four cases, all of which terminated fatally. It is sometimes symptomatic of hysteria, and it often attends apoplexy, hemiplegia, and the last stages of fever and other acute diseases, in all which it is generally a fatal symptom. I have seen it follow, and alternate with, spasm of the gullet, in the course of severe and anomalous forms of hysteria — the most favourable mode or form of its occurrence.

62. *A. The diagnosis* of palsy of the gullet is easy. The continued difficulty of swallowing small quantities or volumes of any substance, whilst larger quantities are taken with greater ease, distinguish this affection from spasm of the tube,—whilst the passage of a probang shows that there is no permanent obstacle. In the slighter cases, there is much difference in the phenomena of deglutition, some patients swallowing more easily solid than fluid or semifluid substances, whilst others can take the latter with most ease. Some swallow with rapidity, or endeavour with great effort to project the morsel through the canal; others accomplish it slowly, and others again require the aid of fluids to perfect the act. When the palsy is complete, then deglutition is impossible. The alimentary bolus is then arrested in either the pharynx or upper part of the gullet: and it may even pass into the larynx and cause cough or suffocation. Owing to the want of power of swallowing the saliva, a discharge of this secretion from the mouth is usually observed.

63. *B. The causes* of palsy of the gullet are rarely such as act directly on this tube. They are to be looked for at the origins, or in the course

of the nerves supplying this part and the pharynx, particularly of the pneumogastric. Baglivi, Valsalva, Dupuy, and others, have shown that animals which have died after division of these nerves were incapable of swallowing, and have retained the aliments in the œsophagus; and cases have been recorded by Koehler, Wilson, Flandin, Montant, Esquirol, and others, in which this form of palsy was owing to hydatids, tubercles, cysts, tumours, or other organic lesions, at the origin of these nerves, or at the base of the cranium, or in their vicinity. Palsy of the gullet is often a part, and even the most important and prominent part, of the palsy, so frequently observed in the most severe and chronic cases of insanity.

64. *C. The treatment* should depend upon the cause of which this affection seems, in each case, to be the effect. If it proceed from congestion or pressure at the origins of the nerves, local depletions and permanent derivatives are required. If it be viewed as the result of tumours of any description pressing upon the nerves of the tube, the preparations of iodine, particularly the iodides of potassium or of mercury, or a solution of the bichloride of mercury, may be employed. In a case recorded by Wilson, this affection was caused by venereal exostosis of one of the cervical vertebræ, and was cured by anti-venereal treatment. Dr. Monro adduces two cases which were cured by electricity, which agent, however, is not suitable for cases arising from organic disease at the origin, or even in the course of the nerves. Blisters, mustard poultices, stimulating liniments or embrocations, ointments containing strychnine, &c. applied to the neck, throat, or upper part of the sternum; moxas, issues, setons, and blisters kept freely discharging for a considerable time in the same situations; stimulating gargles, and sialagogues; purgative and stimulating enemata, as spirits of turpentine with castor oil, assafœtida or camphor; comprise the most efficient means that can be prescribed for this very unfavourable, and most frequently fatal, affection. When the palsy is slight and symptomatic of hysteria, the means advised for other forms of hysterical palsy (see Hysteria, § 93.) should be employed. Whilst these or other means, which the peculiarities of the case will suggest, are being used, the patient should be sustained by nutritious substances administered as lavements, or conveyed into the stomach by means of an œsophagus-tube.

65. VI. Foreign Bodies in the Œsophagus. — Fragments of bones, or other hard, or solid, or sharp, bodies, are not infrequently swallowed and arrested in some part of the gullet. The usual consequences, when they are allowed to remain for any time in this situation, are inflammation, suppuration, ulceration, and ultimately even perforation, of the parietes of the tube. — *A.* The *symptoms* vary with the size and form of the foreign body, and with the position of it in the part in which it is lodged; but there is always severe pain, remarkably increased upon attempts at deglutition, which is generally attended by spasm and by more or less difficulty, or complete inability to accomplish the act. If the body be large and arrested in the upper part of the tube, or near the pharynx, there are also violent strangulating and almost suffocating paroxysms of cough. When angular or sharp bodies continue long in the œsophagus, they may not merely perforate the parietes, but even ulcerate or perforate adjoining parts as an important artery (Kirby), the trachea, &c., or produce caries of a vertebra (Valpeau), and in still rarer instances dilatation of the gullet above the seat of mechanical obstruction.

66. *B. Leeches* are sometimes swallowed, when drinking water from pools incautiously, and, fastening themselves to the parietes of the gullet, sometimes occasion severe and peculiar symptoms. Accidents of this kind have been noticed by Galen, Celsus, Pliny, and Dioscorides, and in modern times by Larrey, Double, Duval, and others. M. Valpeau states that, besides the pain, they produce a peculiar sensation of suction, with difficulty of swallowing, followed by vomiting of blood; and sometimes by very severe nervous symptoms.

67. *C.* The *treatment* of these accidents is more surgical than medical. When the foreign body can be extracted, to attempt extraction is preferable to pushing it by a probang into the stomach. The nature, size, shape, and chemical composition of the body should guide the physician in his opinion as to the propriety of attempting extraction or the other alternative. In some cases, it may be advisable to try the effect of an *emetic*, when this can be passed into the stomach; but the propriety of having recourse to this treatment should depend upon our knowledge of the obstructing body. In the case of leeches adhering to the sides of the tube, emetics may be employed without risk. As to the surgical means I must refer to modern works in which this subject is treated.

Bibliog. and Refer. — *Avicenna*, Canon. l. iii. feu. 13. t. ii. cap. 7. 12. — *Willis*, Pharm. Rat. sec. i. c. i. p. 45. — *Brunner*, De Gland. Duod. c. 10. p. 136. — *H. Boerhaave*, Atrocis nec descripti prius Morbi Historia, &c. 4to. Leyd. 1724. — *Schneider*, in *Halleri's* Disput. Med. t. vii. p. 594. — *Ziesner*, in ibid. t. vii. p, 629. — *Mauchart*. — *Haller*, Disp. Chirurg. t. ii. p. 395. — *F. Hoffmann*, De Morbis Œsophagi Oper. Sup. ii. p. 251. — *Vater*, De Deglutitionis difficilis Causis Abditis, Vitemb. 1750. — *A. Monro*, Edin. Essays and Observat. vol. iii. p. 534. — *Dallas*, in ibid. vol. iii. p. 525. — *Morgagni*, De Sed. et Caus. Morb. Epist. xxviii. 15. — *Malacarne*, in Memorie della Societa Italiana, t. x. 1. — *Haller*, Opuscula Pathol. obs. lxxi. — *Gyser*, De Fame Leth. ex Callosa Œsoph. Angustia, 4to. Arg. 1770. — *Honkoop*, De Morbo Œsophagi Inflammatorio, Lugd. Bat. 8vo. 1774. — *Helian*, Mém. de la Soc. Roy. de Méd. Ann. 1777. p. 217. — *Ludlow*, Med. Observat. and Inquiries, vol. iii. — *Murray*, in Mém. de l'Acad. des Sc. de Suède, t. xl. 1779. — *Wathen*, in Mem. of Med. Society of Lond. vol. i. — *Blair*, in ibid. vol. v. art. 33. — *Flajani*, Collezione di Osservazioni, t. iii. osser. 62—65. — *J. Bleuland*, Observat. Anatomico Medicæ de Sana et Morbosa Œsophagi Structura, 4to. c. fig. Leyd. 1785. — *Borsieri*, Institut. Med. Pract. vol. iv. p. 291. — *Sandifort*, Mus. Anat. t. 104. fig. 3. — *A. Portal*, Anat. Méd. t. v. p. 204. — *Reil*, Memorab. Clinica, fasc. i. p. 13. — *Zeviani*, in Memorie di Fisica di Verona, t. vii. — *Meier* in *Baldinger's* Magazin, b. iii. p. 399. — *M. Baillie*, Series of Engravings, &c. fasc. iii. — *E. Home*, Pract. Observat. on the Treatment of Strictures in the Urethra and Œsophag. 8vo. Lond. 1803. — *Pinel*, Nosog. Philosoph. t. iii. p. 153. — *Sue*, in Mem. de la Soc. Méd. d'Emulat. t. iv. p. 218. — *Smith*, in Lond. Med. and Phys. Journ. vol. ix. p. 552. — *Purton*, in ibid. vol. xlvi. p. 540. — *J. Shaw*, in ibid. vol. xlviii. p. 185. — *Bayle et Cayol*, Dict. des Sc. Méd. t. iii. p. 615. — *Andrews*, Observat. on the Applicat. of Lunar Caustic to Strictures of the Urethra and Œsoph. 8vo. Lond. 1807. — *Brogna*, in Journ. Gen. de Méd. t. lii. p. 31.; et *Lecheverel*, in ibid. p. 145. — *Chantourelle*, Mem. de la Société Méd. d'Emulation, t. ix. p. 295. — *Abrahamson*, in *Meckel's* Archiv. b. i. st. iii. p. 16. *Kirby*, in Dublin Hospital Reports, vol. ii. p. 224. — *Noverre*, Bullet. de la Fac. de Méd. de Paris, t. vi. 1819. — *Gaitskell*, in Lond. Med. Repos. t. x. p. 353. — *G. De Claubry*, Recueil Périod. t. xxxiv. p. 13. — *J. B. Paletta*. Exercit. Patholog. p. 228. 4to. 1820. — *Wilson*, Recueil Périod. t. xlv. p. 450. — *V. N. ab Hildenbrand*, Institut. Practico-Medicæ, vol. iii. p. 143. — *Larrey*, Mém. de Chirurg. Milit. t. ii. p. 147. — *Dumas*, Consult. et Observat. de Méd. p. 428. 8vo. Paris, 1824. — *Boisseau*, Pyretologie Physiol. p. 97. 8vo. Paris, 1824.; et Nosographie Organique, t. i. p. 131.—*Barras*, Révue Medicale, t. i. p. 326. 1826. — *Pagenstecher*, Journ. des Progrès des Sciences Médicales, t. viii. p. 268. — *C. Bell*, Lancet, vol. xii. p. 707.—*G. C. Blondeau*, Quelques Réflex. sur les Corps Etrang. arrêtés dans le Pharynx ou l'Œsoph. et sur les Moyens de les extraire, 4to. c. fig. Paris, 1830. — *A. Monro*, Morbid Anatomy of the Gullet, Stomach, and Intest. &c. 8vo. 2d ed. 1830, *passim*.—*Andral*, Med. Clinique, t. ii. p. 9.; et Anat. Patholog. t. i. p. 276. — *Lindsay*, in Med. Chirurg. Review, vol. xxix. p. 407. — *Fletcher*, Medico-Chirurg. Notes and Illustrat. 1st part, p. 26. Lond. 1831.—*J. J. Leroux*, Cours sur les General. de la Méd. Prat. t. i. 8vo. Paris, 1825.—*Cummin*, in Transac. of the Medical and Chirurgical Society of Edinburgh, vol. iii. p. 593. — Nouveau Journ. de Méd. t. vi. p. 8. — *Mondière*, Archives Génér. de Méd. t. xxiv. p. 394., t. xxvii. p. 196.; t. xxx. p 507.; et t. ii. 2d ser. p. 520. — *Cassan*, in ibid. t. x. p. 79. — *Omboni*, in ibid. t. xxi. p. 438. — *Begin*, in Journ. Hebd. de Méd. t. ii. p. 94. 1833. — *Gendron*, in ibid. t. i. p. 378. 1836. — *Carswell*, in ibid. t. vii. p. 321. — *Roche*, Pathol. Medico-Chirurg, t. i. p. 454. — *Raimann*, Handbuck der Speciellen Therapie, b. i. s. 322. — *Broussais*, Annal. de la Méd. Physiol. t. iii. p. 254. — *J. M. Arnott*, in Trans. of Med. and Chirurg. Soc. of Lond. vol. xviii. p. 86. — *Blandin*, in Dict. de Méd. et Chir. Prat. t. xii. p. 143. — *Velpeau*, in Dict. de Med. 2d edit. art. *Œsophage*.—*Cruveilhier*, Anat. Pathologique, livr. xv. xix. xxvii. et xxxviii. — *H. Mayo*, Outlines of Human Pathology, p. 280. 8vo. Lond. 1836. — *G. F. Most*, Encyklopädie der Gesammten Medicinisch. u. Chirurg. Praxis, b. ii. p. 218.

OSSEOUS SYSTEM, Diseases of. — *The Osseous Structure, or Tissue.*

Classif. — Special Pathology, and Pathological Anatomy.

1. The bones are liable to the same diseases as other parts of the frame—to similar changes of both a constitutional and a local nature to those which affect other structures. Many of these changes are merely results of inflammation arising generally from local causes, but always modified, and sometimes even produced, by constitutional peculiarity or diathesis, or by a vitiation of the fluids and ultimately of the solids of the body, as observed in scrofula, gout, fever, scurvy, &c. Other changes, and these the most serious and often most dangerous, appear independently of inflammation, and are more or less the result of constitutional vice, although frequently excited or developed by local causes, as by contusions or other injuries. I shall consider *first* inflammations of bones and their consequences: and *next*, the organic lesions of bones that appear independently of inflammation, although often accompanied with it in their course.

I. Inflammation of Bones. — Synon. — *Osteitis* (from οστεον, a bone); *Ostitis, Inflammatio ossium. Osteite, Inflammation des os*, Fr. *Die Knockenentzündung*, Germ.

Classif. — III. Class. I. Order (*Author.*)

2. Defin. — *Pain in the situation of a bone, encreased upon firm pressure, or when sustaining a weight, with more or less swelling, and often with symptomatic fever, the substance of the bone being encreased in vascularity and often otherwise changed.*

3. *i. Seat and anatomical Characters.* — Inflammation may attack the substance of a bone, and be limited to it; or may affect chiefly the periosteum, or the medullary membrane, and extend thence through the substance of the bone, or may extend from the latter to these membranes. In either case, the inflammation may affect a portion only, or the whole bone; or it may be limited to the body, or to the articular extremity. When commencing in the external or internal layers of the bone, it often is confined for a long time to them, but it frequently extends to the whole structure, especially in the spongy bones, and in young subjects.

4. Osteitis is generally a chronic disease, — or it is rarely so rapid in its course as inflammations of other organs,—a circumstance manifestly owing to the nature of the osseous structure. The most acute or rapid forms of the disease are usually from several weeks to some months in duration, whilst the most chronic states may endure for several years.

5. Osteitis may occur in any bone, but it is most frequently observed in the more superficial bones, and in the more spongy and vascular in their structure. The bones of the hands and feet, the bodies of the vertebræ, and the articular ends of long bones, are the parts most frequently affected.

6. *The anatomical Changes* consequent upon inflammation of the bones are, encreased size of all the vessels running through the vascular orifices and canals; vascular injections in parts which usually do not contain red blood; and a somewhat reddened and swollen state of the affected bone. In the more prolonged cases, the cells and canals encrease in size, are irregular, or partially run into each other by absorption of their walls, and are filled with a sanguineous lymph, so that the fine membranes lining them are found somewhat thickened. The proportion of lime in the bone is sometimes more or less reduced, according to the duration and intensity of the inflammation; and occasionally the periosteum is thickened and relaxed, particularly when the disease commenced in it; and then the surface of the bone usually is rough and porous.

7. ii. *Causes.* — Osteitis is more frequently met with in children than in adults.—*a.* The *predisposing causes* are the rheumatic and gouty constitution, the scrofulous diathesis, and the scorbutic and syphilitic contamination of the frame. Of these, the scrofulous, syphilitic, and scorbutic vices are the most influential.—*b.* These often also *excite* osteitis.—*Rheumatism* frequently attacks the fibrous tissue covering the bones, and the inflammation, thus originating, often extends to the bone itself, and terminates in caries. Articular osteitis occurring in adults generally originate in rheumatism.—*Gout* occasionally excites articular osteitis, chiefly in persons advanced in age, and after repeated attacks.—*Scrofula* is a most influential predisposing and exciting cause of osteitis, in both children and adults, particularly in the short bones, and in the spongy ends of long bones. It also favours the passage of the disease into caries. — *Scurvy* seldom affects the bones until it is far advanced, and then it implicates the dense structure of the bones, rendering it softer, and favouring the rapid supervention of caries, as fully shown by M. J. L. Petit.—*Syphilis* inflames the bones often consecutively upon periostitis, and frequently gives rise to exostosis.—*Exhaustion* of vital energy, venereal excesses and masturbation, fevers, and visceral disease, also favour and even directly cause osteitis; but in these cases the vertebræ are the parts most frequently affected.

8. *c.* The more *local causes* are usually *exciting* only, and often concur with the preceding in developing the malady. Every kind of external or local injury, as fractures, contusions, wounds, pressure, &c.; intense heat or cold, applied to an extremity or part; inflammations, particularly

those which are chronic, in the immediate vicinity of a bone; and suppuration or purulent collections coming in contact with it, are the most common and active causes.

9. iii. *Symptoms.* — At the commencement of osteitis the patient feels a dull, sometimes an acute pain within the bone or deeply seated. The pain is encreased upon firm pressure, and upon any exercise that affects the bone, as standing upon it or supporting a weight by it. This is often the only symptom for a considerable period. After a very variable time, a slightly hard and smooth swelling may be detected, by passing the fingers along the seat of pain, unattended by any discolouration of the surface. The swelling is fixed, and continuous with the surface of the bone; and, although the substance of the bone is generally more or less tumefied, still the chief part of the swelling that is detected is owing to inflammation of the periosteum covering the affected bone.

10. The progress of osteitis is always slow, owing to the low vitality and structure of the affected part; but sometimes the pain becomes extremely acute, and the swelling increases more rapidly, the disease assuming a more acute form. This state is most common to venereal osteitis, and is not readily distinguished from periostitis; excepting that the pain is referred to the bone itself at the commencement, and that the swelling is at first very slight, and the progress of the affection slow. When the swelling is caused by periostitis, its progress is more rapid than that of osteitis, it advances further, is less hard, and becomes at last somewhat soft and elastic. The aching nature, the persistence and the seat of pain, with the modifications of it by position, exertion, &c., are the chief guides we possess as to the existence of inflammation of deeply-seated bones.

11. When the inflammation implicates the *medullary membrane* lining the canals of long bones, and the cells of the spongy structure, this membrane is injected, red, and, according to LOBSTEIN, more dense; and the marrow is augmented in volume, as well as the fluid contained in the cells of the spongy structure. Inflammation of this membrane is not infrequent after amputations, and is then sometimes propagated from the amputated surface along the whole medullary canal. It is attended by the same symptoms as those characterising osteitis; but, when following amputations, it is not so painful, is more rapid in its progress, and more readily passes into suppuration, than in other circumstances, and other states of osteitis.

12. iv. The *terminations* or *consequences* of osteitis are resolution, exostosis and induration, suppuration, gangrene or caries, and necrosis. — *A.* After *resolution*, the structure inflamed regains its former state; but the swelling generally continues for some time after pain has disappeared. — *B. Exostosis* and *induration* are sometimes associated results, whilst either may occur singly. The indurated portion of bone assumes an ivory or dense appearance, more especially in some exostoses. The increased deposition of bony matter — *exostosis* — *hyperostosis* — occurs as *internal* and *external exostosis.* The former, in a lesser degree, is an usual consequence of inflammation; the deposition of bony matter in the diploe necessarily increasing the *weight* and *solidity* of the bone. If the inflammation have been of very long duration, the more the weight and solidity of the deposit are increased, the part assuming an ivory state, and the medullary cavity being encroached upon by the deposition.

13. The *external* form of increased deposition of bone is more common than the internal, and is oftener injurious. In some cases, the bony deposit takes place in the loosened periosteum, which first becomes cartilaginous and afterwards bony, in leaf-like patches, forming *nodes* or *gummata.* In others, the bony deposit occurs in the outer table of the bone, forming a local and defined prominence — a *bony tumour* or *external exostosis.* An exostosis may form simultaneously in the internal and external surface of a bone. This takes place chiefly in the bones of the skull. These bones, and the tubular bones, are the most frequent seats of exostosis; and next to them the vertebræ and pelvis. But they may be produced on any bone; or even on several bones at the same time. They often form in a considerable number in the vicinity of carious bones. They may assume any form, and attain any size, from that of a split pea to that of a child's head. The structure of exostoses varies remarkably. Some are firm, dense, and ivory-like. In others, innumerable bony fibres spring up from the bony surface into the inflamed, spongy, and loosened periosteum. These fibres are harder and closer at their base than at their termination in the periosteum, where they are often soft and cartilaginous. In a third variety, the exostosis seems to consist of an expansion of the external table or surface of the bone, from within, by the effusion or infiltration of matter beneath it. Bony tumours of this kind are common in the lower jaw and bones of the hand. Their interiors are loose, cellular, or spongy, very vascular, and the cavities are filled with substances varying in consistence from lymph to soft cartilage. This last variety becomes much larger than the others, readily inflames, and suppurates; or increases still further in bulk, by dilatation of the internal cells composing them.

14. *C.* When *suppuration* takes place, in addition to the anatomical characters of inflammation, the periosteum becomes fungous or spongy, and less adherent, when the external surface of the bone is inflamed. And this surface is rough, unequal, and eroded, and changed to a greyish or dark hue. If the disease has commenced by destruction of the articular cartilages, the affected bone presents similar appearances. If osteitis has originated in the substance of the bone, the bony structure is softened, is changed to a yellowish, greenish, or brownish tint, and the centre of the softened parts is infiltrated with pus, or with a dirty greyish ichor, of an offensive odour. As the disease proceeds, the softening and discolouration of the bone increases, until *caries* and *ulceration* are established.

15. *D. Caries* consists in a greater or less destruction — *ulceration* — and discolouration of bone, with a secretion of a puriform or of a fœtid sanious matter. Young and spongy bones, abundantly supplied with vessels, most readily become carious. In many instances, owing to destruction of adjoining parts, the periosteum and outer surface of the bone are first destroyed; but when the disease commences in the substance of the bone, a circumscribed abscess is sometimes formed; or the softened portions of bone, infiltrated with a sanious fluid, are partially absorbed or partially

dissolved, as they lose their vitality in the effused fluid, thereby forming ulcerated or fistulous cavities, containing puriform or sanious matters. These cavities, or sinuses, make their way to the surface of the bone, and thence to more external parts.

16. *E. Necrosis*, or mortification of bone, is a frequent consequence of osteitis, as well as of destruction of the periosteum. It may occur in any part of the skeleton, although it more frequently attacks the hard bones, and is always succeeded by the separation of the dead portions of the bone from the living. According to the state of the bone, and the causes and circumstances of the inflammation, of which necrosis is the consequence, the dead bone exhibits various differences. If the bone die in consequence of gangrene of the surrounding parts, the necrosed bone is spongy, light, frangible, and blackish brown. If the necrosis be caused by scurvy or hospital gangrene, it is similarly discoloured and softened. In common necrosis, however, the dead bone is dry, rough, deficient in gelatine, porous or corroded externally, generally white, but sometimes coloured blackish or brown by the offensive sanies poured out around it. When necrosis follows osteitis, it may be either the consequence, or the cause of caries. Mortification sometimes occurs only in certain layers of bone — in the external — *superficial* or *external necrosis;* or in the internal layer or table, — *internal* or *central necrosis;* or the whole substance or mass, — *total necrosis*. The *first* usually arises from exposure or denudation of the bone, but it may also proceed from inflammation of the surface or external layer of bone, and the consequent detachment of the periosteum. *Internal necrosis* occurs almost only in tubular and round bones ; *total necrosis* in solid bones also. Total necrosis, especially in tubular bones, is attended by a discharge from the internal surface of the periosteum, and external to the dead bone, of a jelly-like mass, which gradually hardens and is ossified, surrounding, like a sheath, the necrosed bone, or *sequestrum*. As this bony sheath separates from the inclosed sequestrum, or dead bone, it becomes lined by a delicate medullary membrane. In the midst of the bony sheaths are one or several holes — the *foramina grandia* of TROJA, the *cloacæ* of WIEDMANN — which communicate with the existing sinuses of the soft parts, and form an outlet for the continually-absorbed and diminished sequestrum, as well as for the secreted pus or lymph, and when these are discharged, these holes gradually close. In the *internal necrosis* the process is nearly the same ; but in this case the jelly-like matter forming the new bone is poured out from the internal surface of the remaining living bone — from the surface of the living bone adjoining the dead bone ; the living bone often swelling at the same time, and being somewhat softened.

17. *a. Causes of Necrosis.*— Whatever, either in the substance of the bone or in the periosteum, interrupts the nutrition of the bone, or inflames it, may conduce to necrosis. But if the mischief in the periosteum, medulla, or substance of the bone, be of trivial extent, limited suppuration, or abscess, passing into caries and ulceration, are the more common results. The *causes* of necrosis are the same as those of osteitis—are external, or internal and constitutional. But either of these may be so energetic as almost immediately to destroy the life of the bone ; but more commonly they excite inflammation of the bone, of which the necrosis is a termination or consequence. Mr. STANLEY has shown, that bone may perish from inflammation of it without our being always able to recognise inflammatory symptoms, and yet the existence of inflammation antecedent to the necrosis is undoubted. Owing to the grade, severity, and constitutional relations of the inflammation, or to other causes, the symptoms of osteitis may be so slight as to escape notice. The existence of necrosis is generally more easily detected.

18. Osteitis productive of necrosis may be either mild, slight, or severe and active. The symptoms of osteitis are sometimes so mild as to render the diagnosis difficult. This most commonly occurs in debilitated constitutions, in which the necrosis affects only the external part of a bone, and originates in some chronic and constitutional cause, as scrofula, syphilis, scurvy, &c. But when necrosis supervenes in the substance and the interior of a bone, and occurs in plethoric, irritable, or robust persons, it is both preceded and attended by acute symptoms, by severe pain, much fever, and restlessness ; the disease proceeding more rapidly to a termination.

19. *b. Symptoms.*—The swelling accompanying necrosis forms and increases gradually, particularly when caused by osteitis. In the slower and more mild cases, the pain is inconsiderable and dull or aching ; but when the swelling increases rapidly, or when the patient is plethoric and irritable, it is more violent. The swelling, as soon as mortification takes place, is much greater than in osteitis ; still it is not elevated into an apex, but is so diffused along the bone that its limits cannot be distinguished ; and this diffusion of the swelling is the more remarkable the more deeply seated the inflamed and necrosed bone. It may even extend over the whole bone or limb. The swelling commences with the osteitis, and increases until the matter which is formed finds its way out through the soft parts ; when the tumefaction partially subsides. When necrosis is advancing, œdema of the soft parts is often present. The abscess attending necrosis proceeds more rapidly the more intense the inflammation, and the nearer the bone is to the surface ; but when the necrosed bone is deeply seated, and the inflammation more chronic, the abscess is greater and advances more slowly to the surface ; often forming sinuses, particularly if fasciæ intervene. The matter discharged varies in character wtth the constitutional symptoms and origin of the osteitis which has thus terminated. It is sometimes pure pus, but most frequently it is sanious, acrid and fœtid. As the necrosis proceeds the sinuses formed by the outlets of the matter become fistulæ, through which not only the matter, but the remains also of the dead bone make their way.

20. The swelling attending necrosis is always diffused and situated upon a bone, the bone seeming included in the swelling. Even when suppuration has commenced and advanced, it appears deeply seated and obscure. The skin long retains its colour, and does not exhibit a red or livid hue until matter is advancing through the soft parts.

21. *c. The formation of new bone* is a most important part of the phenomena attending necrosis, and much discussion and experimenting have been devoted to the subject by modern surgeons ; the

results being nearly as follows: — When the bone dies, consequently either upon osteitis, or upon destruction of the medullary membrane or of the periosteum, the phenomena vary with the part which is first destroyed. If the medullary membrane is destroyed, and the inner layer, or the whole substance of the bone becomes dead, then the periosteum acquires a high degree of vascularity, and becomes thickened, soft, spongy, and loosely adherent to the bone. The cellular tissue also surrounding the periosteum becomes more vascular and infiltrated with lymph. The periosteum thus changed, quitting its hold of the dead bone, is now the formative organ of the new bone; and a reddish fluid mass is secreted by the internal surface of this membrane and is gradually changed into new bone, and thus the same periosteum which had covered the old bone is also the periosteum to the new. If, on the other hand, the periosteum is destroyed together with the bone, whilst the medullary membrane, which performs the office of an internal periosteum, is preserved, this membrane undergoes changes similar to those ascribed to the external periosteum, and is the medium of the formation of the new bone. This latter fact, insisted upon by WIEDMANN and BOYER, has been fully confirmed by the recent experiments of Mr. STANLEY, who states, that "if one side of the walls of a bone be removed without much injury to the medullary texture, the lost bone will be reproduced by the vessels of the medullary membrane." Mr. MAYO also remarks that if one aspect of the cortex of a cylindrical bone is killed by an injury, the cancellous structure granulates, and reproduces what has been lost.

22. Mr. STANLEY has shown that, when necrosis is attended by destruction of the bone and medullary structure, the bone may be regenerated from *three* sources: — 1st. from the articular ends of the original bone, which are seldom implicated: — 2d. from the periosteum which invested the dead bone: — 3d. from the soft parts indifferently, whatever their nature may be, which surround the periosteum, supposing this to be destroyed. Mr. STANLEY removed the periosteum from a dog's tibia, and destroyed the medullary texture, yet reproduction ensued, evidently by the vessels of the surrounding cellular tissue, which had become exceedingly condensed and adhered to the surfaces of the new bone, thus forming its periosteum. This result agrees with the evidence furnished by the experiments of VILLERMÉ, BRESCHET, and DUPUYTREN on the formation of callus. I believe that the surface of bone itself, particularly its divided surface and exposed cancellous structure, will produce granulations or a fluid substance which will be converted into bone, even independently of the surrounding tissue. I once observed in the cranium of a man who had been trepanned many years before for injury of the head, the circular portion of bone removed being unusually large, that the aperture had been *fully filled up with new bone,* and that the ossific matter had evidently been produced from the divided margins of the old bone, as it proceeded from them in striæ, which converged to the centre of what had been the opening, these striæ being larger near the margin of the old bone, and tapering as they converged to the centre of the opening which they had closed. The new formation was dense and without diploe.

23. v. TREATMENT. — The treatment of osteitis and of its consequences necessarily depends chiefly upon the predisposing and exciting causes, and upon the constitution of the patient. The pain and swelling should be combatted by local depletions, and the antiphlogistic regimen; by warm and emollient cataplasms and fomentations; by the frequent application of a small number of leeches to the seat of pain; by alterative aperients and diaphoretics. If *suppuration* take place, an early vent should be given to the matter that is formed. These means should be pursued with an activity commensurate with the severity of the symptoms, and the strength and youth of the patient. If pus accumulate in the medullary canal, it may be necessary to procure it an outlet by perforating the bone. Dr. MACFARLANE trephined the tibia in two cases with success, in order to give vent to the pent-up matter. The diagnosis, however, of such cases is the chief difficulty.

24. If the disease proceed from *syphilis* or *scrofula*, the preparations of *iodine*, especially the iodides of potassium or of mercury, or the bichloride of mercury, with sarsa or the compound tincture of cinchona; or the iodide of potassium with liquor potassæ and sarsaparilla, are the most efficacious constitutional remedies. I have lately prescribed Mr. DONOVAN's solution of the iodides of mercury and arsenic with great benefit in one case of venereal osteitis. If *scurvy* be connected with the appearance of osteitis, the means advised for that disease should be chiefly relied on (see art. SCURVY).

25. If *necrosis* supervene, the indications suggested by WIEDMANN are most appropriate, namely, to remove the original cause of the disease; to alleviate the symptoms; to support the patient's strength and improve the state of the constitution; and, lastly, to remove the dead portions of bone when they become loose. These comprise the same means as have just now been recommended. In order to improve the constitution of the patient, whether syphilitic or scrofulous cachexia be present, the preparations of iodine, or of mercury, or a combination of both; those of sarsaparilla and of cinchona; the chlorides, particularly the chlorate of potash, combined, according to circumstances, with other remedies, should be principally employed, and aided by pure air, and suitable diet and regimen.

II. ORGANIC LESIONS OF BONES, OCCURRING INDEPENDENTLY OF INFLAMMATION.

CLASSIF. — IV. CLASS. IV. ORDER (*Author*).

26. There are various lesions found in bones which are independent of inflammation at their commencement, although limited or slight osteitis may be excited by them in their course, particularly around them, or in their immediate vicinity. These lesions are generally of rare occurrence compared with those which proceed from inflammation.

27. *A.* SOFTENING OF BONES — *Osteomalacia, malacosteon, osteosarcosis, mollities ossium* — is sometimes caused to a slight extent by the long-continued rest of a joint, but commonly by rickets and scrofula. Softening is owing to the disproportion of the phosphate of lime to the amount of animal matter or jelly; the former being generally reduced to one half its usual amount, and the latter increased about one third. Softened bones are more or less flexible, and are usually

bent or misshapen, partly by the action of the muscles, and partly by the weight of the body. Softening of bones occurs in *two forms:* 1st. In connection with rickets and general debility in *childhood:* — 2d. In adults and *aged persons,* from constitutional vice or debility. — (*a*) *Rickety bones,* according to the increase of their vessels and the expansion of their cells with jelly, become of a red colour and swollen. This softening is sometimes congenital, but it usually occurs in children; and is rarely so general, and so malignant, as that which affects persons advanced in age. — (*b*) The softening observed in *adults and old persons* is often very remarkable; and even in the slighter cases is very rarely controlled by treatment. It is either partial or general. It is met with chiefly in females, and has been observed consequent upon scurvy, syphilis, mercurial disease, tubercles, scrofula, diabetes, lepra, rheumatism and gout, and the accidents connected with parturition, or the more usual consequences of child-bed, as disordered lochia, &c.

28. *a.* Softening of bones, particularly in adults, is generally attended by pains resembling those of chronic rheumatism, or by aching in the bones affected. Afterwards the bones bend or yield to the action of the muscles, or to the weight of the body; and the pains increase on muscular action. The height, size, and form of the body are diminished, changed, and deformed respectively; and the affection usually continues to advance, with all the indications of general debility, until it terminates fatally. In some cases, the teeth are the only bones which altogether escape change.

29. *b.* The softening of bones in adults differs from the rickets of children. The latter is generally cured by treatment or by the progress of age: but the former is progressive whatever may be the remedies employed. The softening accompanying rickets is not attended by pain; that of adults always is accompanied with pain, although the pain is not constant throughout the disease. The softening in the latter also is usually more general and much more remarkable. These circumstances indicate that they are distinct maladies.

30. *c.* The *treatment* consists in the employment of tonics, with lime-water, and small doses of phosphoric acid, or other preparations of lime and phosphorus. Sea-air and sea-bathing, chalybeate and refreshing mineral waters; exposure to the light and to the sun's rays; nutritious and light diet, a dry and pure air, and sleeping in a large airy apartment, are the most appropriate remedies. (See also art. Rickets.) These are generally efficacious in softening in children; but their influence upon the softening of bones in adults is very doubtful.

31. *B.* Fragility of Bones. — *Brittleness.* — *Spontaneous fracture.* — This change is very rarely congenital, and also rarely observed in youth. It usually occurs in advanced age. In it the animal matter is comparatively less abundant than the earthy constituent. The cancerous cachexia is often the cause of this alteration, as shown by Hamilton, Strack, Lobstein, and others. Fragility of bones has been observed also consequent upon gout; and in rare instances upon the same maladies as have preceded softening of bones. Otto states that fragility is not infrequently observed at Breslau consecutively upon cancer, syphilis, and scrofula. It is often preceded by pains in the bones. It is rarely amenable to treatment.

32. *C.* Erosion of Bones generally arises from the pressure of aneurisms or of tumours of any kind. In these cases, the cause is mechanical: the portion of the bone subjected to pressure, having its vitality thereby impaired, is removed by absorption; or the pressure, whilst it obstructs the circulation, favours absorption in the part pressed upon. Otto and others, however, believe that the pressure excites inflammation in the parts subjected to it; that the inflammation is rapidly followed by ulcerative absorption; and that this change differs from caries only in not being attended by suppuration or discolouration of the eroded part.

33. *D.* Sanguineous Tumours are sometimes found in bones, and numerous instances of the occurrence have been recorded by authors. — *a.* Some of these tumours are manifestly *aneurismal,* or owing to a remarkable dilatation of the vessels penetrating the bone. As the small aneurismal tumour enlarges, the surrounding osseous tissue is absorbed, a cavity is formed, the two tables of the bone are thinned, and ultimately perforated. When the tumour becomes considerable it presents the same characters as other aneurisms. The periosteum around the tumour is generally thickened, and the nerves and surrounding tissues pressed upon, stretched, flattened, &c. In some cases, related by Dupuytren, Breschet, Pearson, Lallemand, Scarpa, and others, the tumours acquired very large dimensions. They generally occur in adults, consequently upon injuries, contusions, &c., and are attended by a pulsating pain. When they are large the superficial veins are distended, and the limb swollen and sometimes discoloured. The pulsations cease upon firm pressure on the artery of which the aneurismal vessel is a branch. The *treatment* of these cases is principally surgical — by ligature of the principal vessel or by amputation of the limb.

34. *b.* *Sanguineous Tumours* of a doubtful nature are sometimes found in bones. These tumours are described by M. Berard as differing from the aneurismal and from the fungoid, or hæmato-fungoid, and as consisting of a reticulated structure, resembling that of the cavernous body, containing altered blood and clots of fibrine. These tumours resemble those usually termed aneurism by anastomosis. M. Breschet considers them to arise from a peculiar inflammation of the osseous tissue, in which the venous canals of the bone are chiefly affected. They may be also viewed as erectile vascular tumours. Their progress is similar to that of aneurismal tumours, but more slow. They are not amenable to treatment; amputation being the only certain cure.

35. *E.* Tubercular formations are occasionally found in bones; and have been very minutely described by MM. Delpech, Nichet, Nélaton, and Berard. They present themselves in two forms, the *encysted* and the *infiltrated.* The *encysted* is found in two states — the *crude* and the *softened.* — *a.* In the former state, tubercles occur in the substance of the bone, the places or cavities they occupy being a loss of the substance of the bone, owing to the absorption of it as they are developed and increased. The cavities

are smooth at first, but become, as they increase, rugous and anfractuous. They ultimately, by their enlargement, open, either into each other, if the tubercles are clustered, or ultimately in the periosteum, or into a joint. The bone is generally slightly injected to the extent of one or two lines around the tubercles. As they open into the periosteum this membrane becomes injected at that part, and deposits a layer of ossific matter, which for a time resists their further progress. These tubercles commence in small greyish, semitransparent granulations, each of which is inclosed in osseous cells with solid partitions; but as they increase the partitions are absorbed, and the matter is contained in a single cavity, and one cyst (NÉLATON). They thus resemble tubercles in other organs. As the tubercular mass, thus formed, increases, it becomes *softened* generally from the centre to the circumference, but sometimes at first at its periphery, and it ultimately assumes a pultaceous state, in which it escapes by an opening, or a fistula, in the surface of the bone, and gives rise to an abscess in the soft parts, covering the outlet from the bone. As it is evacuated, the cavity in the bone is obliterated gradually by thickening of the membrane of the cyst, and ultimately a spontaneous cure is thereby effected. The filling up and cicatrisation of tubercular cavities is thus fully established in respect of bones.

36. *b. Tubercular infiltration* of bone has been only recently described by M. NÉLATON, who particularises two forms of it, one *semitransparent* and *firm;* the other *opaque* and *puriform.* The infiltrated matter softens gradually and becomes liquid and puriform. At the same time, the osseous cells of the infiltrated part become partly obliterated by thickening of their partitions, and the blood-vessels obstructed by this interstitial hypertrophy, so that the death of the portion of bone thus affected often ultimately follows, the necrosis not being the result of inflammation, as supposed by M. DELPECH, but of obliteration of the vessels of the part.

37. *c.* Tubercular disease of the bones is much more common in childhood than at any other age. It may occur in adults, but is the more rarely observed the more advanced the period of life. It affects chiefly the spongy parts, but it may affect any of the bones. It is most commonly observed in the bodies of the vertebræ, in the extremities of the long bones, in the sternum, &c.

38. *d.* The *duration* and progress of the malady varies with the parts affected by it. The *encysted variety* generally advances to the external surface of the bone as it softens, penetrates the periosteum, notwithstanding the defence offered by this membrane to its progress (§ 35), opens into the soft parts, suppurates, and forms a fistula, and the matter, advancing to the surface, is discharged externally. Ultimately the cavity in the bone is obliterated in the manner stated above, if the case proceed favourably. When the tubercular mass forms in the extremity of a long bone, it generally makes its way to the articular surface, in preference to the periosteum. The *infiltrated variety* proceeds more slowly, and generally terminates by caries or necrosis.

39. *e.* The *symptoms* of tubercles of the bones are very obscure in the early stages. As long as the disease is confined to the substance of the bone, slight or occasional pains are only complained of. But when the mass affects the periosteum, and especially if it have penetrated into the soft solids, the abscess that is formed, and subsequently the tubercular character of some of the discharge, will point out the nature of the disease. The changes which afterwards take place vary much; but the state of the bone may be partly ascertained by examination, by the local appearances, and the constitutional symptoms.

40. *f.* The *treatment* is necessarily the same as I have suggested for scrofulous osteitis and scrofulous necrosis (§§ 24, 25). See also the article on ABSCESS.

41. F. OSTEOSARCOMA, OR MALIGNANT TUMOUR OF BONES—*Bony Cancer—Osteosteatoma—Fungus ossium—Cancer ossium—Exostosis fungosa—Exostosis carnosa—Ex. carcinomatosa, &c.,* —presents various forms.—*a.* In some cases it approaches the fungo-hæmatoid or encephaloid character; in others it more nearly resembles the scirrhous: in a few it is fleshy, and in many it presents cavities filled with a substance of varied density and colour. In general, however, the tumour at first consists of a somewhat homogeneous, greyish, or greyish white, unvascular mass, intermixed with bony points and fibro-cartilaginous fibres, more or less firmly consolidated with albumen. As the tumour advances, its tissue becomes rarified or loosened, forming cells of various sizes, filled with a light-coloured semi-transparent jelly. Inflammatory action or vascular excitement now often takes place in the tumour, and the cellular tissue lining the cells becomes thickened, and secretes an albuminous substance, which is sometimes soft and brain-like, at other times more consistent, or even hard. In other cases, cellular tissue, loaded with albumen, is formed in it. The blood-vessels gradually enlarge in the periosteum, and in the interior of the tumour, and cavities are formed in the latter, filled with venous blood. Blood is sometimes also effused in the brain-like substance, or is mixed with it. Innumerable bony fibres or plates commonly project from the bone outwards, penetrate the tumour in various directions, and, becoming softer and larger, are finally united with the fleshy and membranous parts lying upon it.

42. These tumours assume various changes and appearances in different cases. If they are formed in the centre of a bone, they distend the layers or plates, and reduce them to a thin shell. In many cases the bone almost disappears, and merely a few irregular osseous spiculæ or plates are formed in the tumour. These tumours may reach a very large size—may even be two feet or two feet and a half in circumference, and ten or twelve pounds in weight. They are generally knobbed or irregular on the surface, and of various degrees of hardness. The bone adjoining the tumour is altered to some extent. The cells are enlarged, red or inflamed; occasionally even carious. New formations of bone are sometimes produced in the vicinity.

43. *b.* Osteosarcoma may affect any bone, but it is observed most frequently in the bones of the face, at the base and arch of the cranium, in the long bones. It is most frequently observed in adults and advanced age, and very rarely in childhood. The precise *tissue* in which the

malady originates has not been fully determined. BOYER supposed that the disease commences in the soft parts, and attacks the bones only secondarily. Others believed that it begins in the bone itself. M. SANSON supposed that it originates either in the medullary membrane, or in that lining the spongy cells,—an opinion which seems to accord with that entertained by SANDIFORT, SIEBOLD WALTHER, EBERMAYER, and OSSIUS. LOBSTEIN, however, considered the medullary membrane not to be its original seat, as the tumour is sometimes found external to this membrane, which has remained sound. It may probably arise either from this tissue, or from the membrane lining the vascular canals and spongy cells.

44. *c. Symptoms.*—This malady is first announced by acute deep-seated pains, which often are long felt before any tumour can be detected. The constitution also frequently betrays disorder before it is observed. As soon as swelling appears, its hard, knobbed, unequal surface, the manner of its involving the whole bone, and its complete immobility, indicate its nature. At a still further advanced stage, the pains become more acute and lancinating, the soft parts are involved in the tumour, and are also painful; the skin sometimes is inflamed and ulcerated, particularly when the disease is very far advanced, and red fleshy or fungous excrescences, which bleed on the slightest contact, spring from the surface. The patient's condition becomes rapidly worse; fever, sleeplessness, and marasmus, characterising the last period of his existence.

45. *d.* The *prognosis* of this malady is most unfavourable; amputation or complete extirpation of the disease, where either can be done, so as completely to remove the affected part, being the only *treatment* which is of any avail.

46. *G.* HYDATIDS are rarely found in bones; but instances of the occurrence have been recorded by VAN DER HAAR, CULLERIER, WEBSTER, WICKHAM, FRICKE, DUPUYTREN, COOPER, KEATE, and others. The hydatidic cyst, containing the small rounded vesicles, &c., presents the same appearances and changes as are described in the article HYDATIDS. It is usually found in the spongy part of the long bones, or in the diploe of the flat bones; but it is also sometimes seen in the diaphysis of the former. In very rare instances the hydatidic mass, after having perforated the bone, if seated near a joint, may penetrate into the articular cavity.

47. *a.* The *progress* of the disease is very slow, being seldom of shorter duration than several years. Having perforated the bone, the hydatidic cyst invades the adjoining soft parts. Ultimately these are destroyed, and it reaches the surface. But in all the cases on record, the tumour formed by it has been opened by the surgeon, before it has perforated the skin. The hydatidic mass, of various bulk, being evacuated, suppuration is established in the cyst, and the *débris* of membranous cysts and dead hydatids, generally mixed with a fœtid pus and sanies, are discharged. When the cyst is inflamed it becomes the seat of an abundant suppuration, which can rarely be arrested without its destruction. When a considerable portion of a long bone is destroyed by the cyst, fracture of it may take place. Cases of this kind are recorded by some of the writers referred to; and is, upon the whole, a less evil than the next to be noticed. If the hydatids are seated near a joint, they may penetrate into it, causing acute inflammation of it at first, that generally passes into a chronic state with structural change of the tissues composing it, and of the heads of the bones.

48. *b.* Hydatids of the bones are *caused* by the influences which produce them in other tissues. The majority of cases on record show, that contusions or other injuries had been received on the part in which the hydatids were seated, or that the venereal disease had preceded their appearance.

49. *c.* The *symptoms* of hydatids in bones are extremely obscure; the first indication furnished by them being a tumour in the part affected, and this rarely appears until they have penetrated the bone. The tumour is attended with little or no pain or tenderness, and no constitutional disturbance, besides that constitutional weakness or deficiency of vital power which favours the developement of parasitic formations. As the tumour increases, it becomes softer and more elastic, similar to lipoma or fungo-hæmatoid tumours. Ultimately it may present more or less fluctuation. It still occasions little or no pain, although it may altogether prevent the use of the limb in which it is seated. The absence of pain, the slow progress of the disease, and the slight affection of the constitution, are the chief means of diagnosis afforded by it. Still, in most of the cases on record, the nature of the malady was not known until the hydatids were evacuated.

50. *d.* The *prognosis* of this malady is always more or less unfavourable. As long as the tumour is unopened, it occasions but little constitutional disturbance; but when it is opened, inflammation takes place, which seriously affects the general health, commonly already impaired, and a prolonged and weakening suppuration is the usual result, which often destroys the patient. The amount of danger, however, depends upon the seat of the hydatids, and the possibility of removing not only them, but the cyst containing them. When they are seated in the bones of an extremity, and are not developed in any other part, surgical interference, aided by tonic or restorative constitutional means, will often prove successful.

51. *e. Treatment.*—The *indications* of cure are —1st. To remove or destroy the hydatidic cyst, or to remove the portion of bone containing it:— 2d. To support the constitutional powers and to enable them to throw off or to resist the disease: —and 3d. To subdue accidental changes of an unfavourable or inflammatory nature, whether local or constitutional, as they arise. The fulfilment of these indications is to be accomplished by surgical and medical measures, of so obvious a kind as not to require particular notice.

52. *H.* SPINA VENTOSA.—I agree with M. BERARD in considering this not to be a distinct disease of bones, as generally supposed; but the result of the organic maladies described above, when they are attended by tumour, swelling, or protrusion of the external plate of bone and periosteum, or by that external configuration which has been described as constituting spina ventosa. These changes and appearances are most commonly produced by the malignant, hydatidic, tubercular, and sanguineous tumours, which have been as fully described as my limits will permit.

53. *I.* Foreign Bodies have been found in bones; and these have lodged in them, either from external injury, especially by leaden bullets, small shot, &c., or been conveyed to them through the medium of the circulation, as in cases where mercury, arsenic, or sulphur has been detected in them. Neither of these however require more than a simple notice at this place. It may be remarked, however, that leaden balls may remain a long time in bone without producing much disease; still caries or necrosis may be occasioned by them.

Bibliog. and Refer. — I. The Pathology of the Osseous System generally. — *C. Havers*, Osteologia Nova, or New Observations of the Bones and Parts belonging to them. 8vo. Lond. 1691.—*J. L. Petit*, Traité des Maladies des Os, &c. 12mo. Paris, 1723. — *Cheselden*, Osteographia, or Anat. of the Bones, fol. Lond. 1733. — *S. Schaarschmidt*, Kurzer Unterricht. von Krankheiten der Knocken, 8vo. Berl. 1740. — *J. G. Duverney*, Traité de Maladies des Os, par *Senac*, 2 vols. 12mo. Paris, 1751. — *F. Sandifort*, Mus. Anatom. 4 vols. fol. Leyd. 1763. *passim.* — *A. Murray*, in Act. Med. Suec. t. i. p. 395. — *A. Bonn*, Descrip. Thesauri Ossium Morbosorum Hoviani, &c. 4to. Amst. 1783; et Tab. Ossium Morbosor. fol. fasc. i—iii. Amst. 1785—88.— *J. F. Boettcher*, Abhandlung von den Krankheiten der Knocken, &c. 3 b. Kœnigsb. 8vo. fig. 1781—92. — *Isenflamm*, Praktische Bemerk. ueber Knocken, p. 293. —*Walker*, in Med. Trans. of Roy. Coll. of Phys. vol. iii. p. 25. — *C. F. Clossins*, Ueber die Krankheiten der Knocken, 8vo. Friburg. 1798. — *A. Boyer*, Leçons sur les Maladies des Os, rédigées par *A. Richerand.* 8vo. Paris, 1803. — *Boyer*, Traité des Mal. Chirurg. t. iii p. 418. &c. — *Delpech*, Précis Elém. de Mal. Chirurg. t. i. ch. 3. Paris, 1816. — *J. Howship*, Observ. on the Morbid Structure of Bones, &c. in Trans. of Med. and Chirurg. Soc. of Lond. vol. viii. p. 57., vol. x. p. 176. — *J. Wilson*, Lectures on the Struct. and Physiol. of the Parts composing the Skeleton, and on the Diseases of the Bones and Joints, 8vo. Lond. 1820. — *Ribes*, in Bullet. de la Faculté de Méd. vol. vi. p. 299. — *Larrey*, Mém. de Chirurg. Militaire, t. iii. p. 367. &c. — *Cumin*, in Edin. Med. and Surg. Journ. No. 82. Jan. 1825. — *B. Bell*, On Dis. of the Bones, 12mo. Edin. 1828. — *A. Scarpa*, De Anat. et Patholog. Ossium Commentarii, 4to. fig. Pavia, 1827. — *J. F. Lobstein*, Mal. de Syst. Ossium, *dans son* Traité d'Anat. Pathol. t. ii. sect. ii. p. 45. 1833. — *H. Mayo*, Outlines of Human Pathology, p. 28. 8vo. Lond. 1835. — *L. J. Sanson*, Dict. de Méd. et de Chirurg. Pratiques, arts. *Os* et *Osteite*. — *P. N. Gerdy*, in Archives Génér. de Méd., 2d series, t. x. p. 127. — *Cruveilhier*, Anat. Patholog. livr. xx. — *A. W. Otto*, Compend. of Human and Comparative Pathol. Anatomy, trans. by *J. F. South*, p. 125. &c. 8vo. Lond. 1831.—*G. Gulliver*, in Trans. of Roy. Med. and Chirurg. Soc. of Lond. vol. xxi. p. 1. — *E. Stanley*, in Lond. Med. Gazette, vol. xx. p. 500. — *A. Bérard*, in Dict. de Médecine, 2d edit. art. *Os*.

II. Special Diseases of the Osseous System. — i. *Inflammations and their Consequences.* — *Avicenna*, Canon. l. iv. fen. iv. tr. 4. cap. 9. — *J. A. Lambert*, Comment. sur la Carie et Corruption des Os, 8vo. Mars. 1656. — *Glass*, in *Haller's* Biblioth. Chirurg. vol. ii. p. 198. — *P. Hoffmann*, De Inflam. Ossium, Hallæ, 1737. — *Wallerian*, Lectiones Curiosæ de Morbis ex Ossium Inflammatione ortis, Reg. 1764. — *Morgagni*, De Sed. et Caus. Morb. Epist. L. 56. — *Wiseman*, Several Surg. Treat. l. ii. et iv. — *Sœmmerring*, De Morbis Vasorum Absorben. p. 164. — *Sandifort*, Mus. Anat. vol. iii. p. 275. — *Trye*, in Med. Communicat. vol. ii. Lond. 1790. — *J. Thomson*, Lectures on Inflammation, p. 39. Edin. 1813. — *Cullerier*, in Dict. des Sc. Méd. t. xiv. p. 218. — *Cooper* and *Travers*, in their Surgical Essays, vol. i. — *Gibson*, in Philad. Journ. of Med. and Phys. Scien. vol. ii. p. 121. — *Richerand*, Nosographie Chirurgicale, t. iii. p. 120. — *Scarpa*, De Anat. et Pathol. Ossium Commentarii, 4to. fig. Pavia, 1827. — *A. N. Gendrin*, Histoire Anatomique des Inflammations, 2 tomes, t. i. and t. ii. p. 564. Paris, 1826. — *Meckel*, Pathol. Anat. vol. ii. p. 274. —*J. F. Malgaigne*, in Archives Génér. de Méd. t. xxx. pp. 59. 177. 1832. — *Maslieurad-Lagêmart*, in ibid. 2d series, t. xiii. p. 273. 1837. — *F. Miesscher*, De Inflammatione Ossium, &c. 4to. fig. Berl. 1836.

ii. *Non-Inflammatory Lesions.* — *Tavry*, in Mém. de l'Acad. Roy. Paris, 1700. — *Morand*, Hist. de la Mal. Singul. et de l'Examen du Cadavre d'une Femme devenue tout-a-fait contrefaite par un Ramollissement Génér. des Os, Paris. 1752.—*Hasty*, in Philos. Trans. vol. xlviii. p. 26. 1753. — *J. Pringle*, in ibid. p. 406. — *Navier*, Observat. sur le Ramollissement des Os, Paris, 1755. — *Louis*, Observat. et Remarques sur les Effets du Virus Cancereux, Paris, 1750, — *C. G. Ludwig*, in Adversaria Med. Pract. t. iii. pars ii. 2.; et Observat. in Cadavere, cujus Ossa emollita erant, Lips. 1757. — *Else*, Med. Observat. and Inquiries, vol. iii. p. 169. Lond. 1769. — *David*, Observat. sur une Maladie connue sous le Nom de Necrosis, Paris, 1782. — *Wiedmann*, De Necrosi Ossium, fol. Franc. s. M. c. fig. 1793. — *Saillant*, Hist. de la Soc. Roy. de Méd. p. 28. 1786.— *Pearson*, in Med. Communicat. &c. vol. ii. — *Russel*, A Pract. Essay on a certain Disease of the Bones, termed Necrosis, Ed. 1794. plates. — *Thomas*, in Edin. Med. Comment. vol. vi. p. 75. — *Portal*, Cours d'Anat. Méd. t. i. pp. 31. 301. —*Daubenton*, Descript. du Cabinet du Roi, t. iii. p. 107. — *F. L. Augustin*, De Spina Ventosa Ossium, 4to. fig. Berl. 1797. — *J. P. Franck*, Delect. Opusculor. vol. ii. p. 304. — *Webster*, in New-England Journ. of Med and Surg., vol. viii. Bost. 1809. —*Renard*, Ramollissement des Os du Tronc d'une Femme, 8vo. c. fig. May. 1804. —*South*, in Lond. Med. Repos. vol. iv. Sept. — *Hutchinson*, in ibid. April, 1815. — *Boyer*, Traité de Maladies Chirurg. 2d edit. t. ii. p. 318. Paris, 1818.— *Pelletan*, Clinique Chirurg. t. ii. p. 14. — *J. Howship*, in Trans. of Med. and Chirurg. Soc. of Edin. vol. ii. p. 136. — *Whateley*, Pract. Observat. on Necrosis of the Tibia, Lond. 1815. — *Béclard*, in Bullet. de la Faculté de Méd. de Paris, 1815. p. 427. — *Dupuy*, De l'Affection Tuberculeuse, &c., p. 50. 265. 8vo. Paris, 1817. — *Villermé*, in Journ. de Médecine de *Leroux*, t. xxxvii. p. 331. — *Otto*, Selt. Beobacht. b. i. no. 40. p. 81. — *Blaise*, Essai sur la Necrose, Paris, 1825. —*Baldy*, in Lond. Med. and Phys. Journ. vol. xl. — *Williams*, Lond. Medical Repos. vol. xvii. p. 204. — *J. F. Bonfils*, Descript. succincte d'une Maladie grave et rare de l'Humerus, &c. fig. Nancy, 1817. — *R. Keate*, in Transact. of Med. and Chirurg. Soc. of Lond. vol. v. — *Flecchia*, Sulla Necrosi, &c. in *Omodei's* Annali Universali de Medic. t. xvii. 1821. — *Crampton*, in Dublin Hosp. Reports. vol. iv. p. 357.— *Koschate*, Observat. Nonnullæ circa Osteosarcoseos Naturam et Indolem, adnexis tribus hujus Morbi Historiis, 8vo. Vratisl. 1826. — *I. Russel*, in Trans. of Med. and Chirurg. Soc. of Edin. 1824. no. iii. — *Lallemand*, in Repert. Génér. d'Anat. et de Phys. Pathologiques, t. ii. p. 253. — *Breschet*, in ibid. t. ii. p. 263. — *Hindernacht*, Ueber die Erkentniss u. d. Behandl. des Knockenbrandes, 8vo. Wurzb. 1827. — *Wickham*, Lond. Med. and Phys. Journ. Jan. 1827, p. 530. — *Henderson*, in American Journ. of Med. Sciences, vol. v. p. 58. — *Flourens*, in ibid. vol. vi. p. 216. — *Lobstein*, Anat. Pathol. t. ii. p. 220. — *Scarpa*, in Ann. Univers. di Medic. Mai, 1830. — *Dezeimeris*, Journ. de l'Expérience, 1838. no. 34. — *N. Guillot*, in ibid. 1830. no. 109. — *Nichet*, Sur les Tubercles de Vertèbres, in Gaz. Méd. de Paris, p. 529. 545. 1835. — *Nélaton*, Recherches sur l'Affect. Tuberculeuse des Os, 4to. fig. Paris, 1837.

III. Regeneration of Bones.—*M. Troja*, De Novorum Ossium in integris, aut maximis, ob Morbos Dependitionibus Regeneratione Experimenta, &c. &c. 8vo. Paris, 1775. — *G. L. Koeller*, Experimenta circa Regenerationem Ossium, 8vo. fig. Gott. 1786. — *E. Stanley*, Observ. on the Condit. of the Bones in Rickets, with Circumstances relating to the Process of Restoration, &c., in Transact. of Med. and Chirurg. Society Lond. vol. vii. p. 404.—*Charmeil*, De la Régénération des Os, 8vo. Metz, 1821. — *Kortum*, Experimen. et Observ. circa Regenerationem Ossium, Ber. 1824. — *Rayer*, in Archives Génér. de Méd. t. i. p. 318. 489. — *Sanson*, in Journ. Univers. des Sc. Méd. t. xx. p. 131. Paris, 1820. — *Breschet et Villermé*, in *Magendie's* Journ. de Physiol. Experimen. t. i. p. 116. — *Knox*, in Edin. Med. and Surg. Journ. vol. xviii. p. 62., and xix. p. 210. — *Craigie*, Elem. of Gener. and Pathol. Anat. 8vo. p. 568. (doubts whether or not the apertures after trephining are ever filled up. The instance I saw, referred to above (§ 22.), is conclusive of the affirmative). — *F. Banneth.* Naturæ Conaminum in Ossibus læsis sanandis Indagatio, 8vo. fig. Bonn. 1131. — *Heine*, in *Graefe* u. *Walther*, Journ. b. xxiv. and in Gaz. Méd. de Paris, p. 386. 1837. — See also Ploucquet's Literatural Medica Digesta, art. *Os*; et Reuss's Repertor. Comment. vol. xii. et xiv.

OVARIA. — Diseases of the. — Syn. *Ovarium, from Ovum, an Egg; Testis Muliebris. Ovaire,* Fr. *Eierstöck*, Germ. *Ovary.*

Classif. — Special Pathology. — Morbid Anatomy.

1. The diseases of the ovaria are extremely numerous; for these organs are liable not only to the disorders and structural lesions to which other organs are subject, but they also occasionally present lesions and displacements which are peculiar to themselves; disorders of formation and of structure connected with the performance of their functions during the epoch of sexual maturity and activity. In the discussion of the pathology of

these organs, I shall consider *first* their functional disorders; *secondly*, inflammation originating in, or extending to them, with its consequences; and, *thirdly*, the lesions of structure presented by them.

I. Functional Disorders of the Ovaria.

Classif. — I. Class. II. Order (*Author*).

2. Defin.— *The non-performance of those functions which may be referred more especially to the vital energy of the ovaria, owing to the imperfect or impaired state of their energy ;—or, inactivity of the ovaria, as evinced by the absence, the defect, or impairment of the functions imputed to these organs.*

3. Several of the disorders which have been treated of under distinct heads may be arranged under this category, as they either originally proceed from, or are more or less intimately associated with, imperfect or prematurely exhausted vital activity of the ovaria; and to this cause they have been assigned when discussing these subjects. Delayed *menstruation, chlorosis,* some states of *sterility*, more especially belong to this pathological condition: but these, having been fully considered under their respective heads, hardly require to be noticed in this place. I may, however, remark, that I have had several opportunities of inspecting the bodies of adult females long past the period of puberty, who have been subjects of delayed menstruation and chlorosis, on which tubercular consumption had supervened, and in all these the ovaria and Graaffian vesicles had remained in the undeveloped state of childhood. In one case, the ovaria were not only remarkably small, but their coverings were indurated, thickened, and nearly cartilaginous. (See arts. Chlorosis, Menstruation, &c.)

II. Inflammation of the Ovaria.

— Syn. *Oophoritis* (from ὤον, ovum ; φέρω, fero), Hildenbrand. *Ovaritis, Ovarite,* Fr. *Eierstocksentzündung*, Germ.

Classif. — III. Class. I. Order (*Author*).

4. Defin. — *Pain in either or in both sides of the hypogastrium, increased on touch or pressure, occasionally with tumour in these situations, and symptomatic fever generally of an inflammatory character.*

5. It has been asserted by M. Dugès and Madame Boivin, that a case of inflammation of the ovarium can hardly be adduced, independently of the pregnant and puerperal states. It must be admitted, that cases occurring independently of these states are rare ; still they are met with, and I have notes before me now of four cases which occurred in my practice unconnected with these states. Primary and uncomplicated ovaritis is comparatively rare ; but ovaritis is more likely to occur in a primary and unassociated form, in females who are neither pregnant nor recently confined, than in those who are thus situated. When it occurs after purturition, it is most frequently complicated with metritis, or with inflammation of the uterine veins.

6. i. Causes. — *A.* The *predisposing*, as well as the exciting, causes of ovaritis, have not been sufficiently ascertained, owing to the disease having been very generally overlooked by writers and practitioners, but the following may be considered as the chief; and the authority of Hildenbrand and others may be adduced in proof of their influence, especially when any of the exciting causes come into operation. Excitement of the imagination by reading voluptuous or immoral works, or romances, or by descriptions of circumstances which affect the desires and emotions, particularly in females unaccustomed, or unable from infirmity of mind, to resist the impulses of feeling and passion ; frustrated expectations of marriage with a beloved object ; venereal desires often excited without being fully gratified ; frequent abortions, and difficult parturition ; and sudden continence on the parts of those addicted to sexual indulgences ; hence, says Hildenbrand, prostitutes, when they are imprisoned, and widows, are more frequently than others affected with diseases of the ovaria.

7. *b.* The *exciting causes* are exposure to cold, particularly soon after delivery ; injuries received upon or near the hypogastrium ; the use of emmenagogues, and of substances to produce abortion ; disordered and especially suddenly suppressed menstruation ; metastasis of rheumatism; sexual excitement at the period of menstruation ; inordinate venereal excitement and masturbation ; premature addiction to venereal impulses, or coition too soon after menstruation, or after parturition, or after inflammatory affections of the uterus. Walther states that, in his numerous post-mortem examinations he very rarely found the ovaria of prostitutes free from inflammatory and structural lesions.*

---

* I have preserved the notes of four cases of *acute uncomplicated ovaritis*, occurring independently of the puerperal states. Besides these, slighter and less clearly defined cases have been seen by me, which have usually been considered as cases of hysteria depending upon vascular excitement or irritation of the ovaria. Of the four cases alluded to, one was *caused* by the sudden suppression of the catamenia, and one from metastasis of rheumatism. The others might be referred to a concurrence of several of the causes assigned above for the disease. The case, arising from metastasis of rheumatism, was remarkable in several respects, especially for the acuteness of the attack. The following is abridged from the original notes: —

Mrs. P——, of ——— Street, Walworth, was attacked 15th of July, 1821, with most excruciating rheumatic pains in the loins and limbs, increased on the slightest motion, or on attempts to turn in bed. She was in a profuse perspiration ; and her pulse was full, strong, and about 100. She attributed the attack to sleeping in a damp bed when travelling. She was about 26 years of age, strong, plethoric, and of the sanguine temperament. The catamenia were usually very abundant, and seldom at longer intervals than 14 days. Their recurrence was, therefore, soon expected. She had never been pregnant. About three days after the commencement of the rheumatic attack, and whilst I was attending her, she suddenly experienced an attack of most acute pain in the hypogastrium, a little above each groin. Soon afterwards two tumours could be distinctly felt in the regions of the ovaria. They were extremely painful and tender upon pressure. The pains in the limbs were greatly abated, but pain was still complained of in the loins. All the inflammatory symptoms continued. The bowels were costive, the urine scanty and high-coloured, with frequent calls to micturition. The countenance was flushed, animated, and excited ; the temper variable and hysterical.

The treatment consisted of one bleeding from the arm ; of repeated doses of calomel, ipecacuanha, and opium combined, saline aperients being interposed, so as to keep the bowels freely open ; of the application of a considerable number of leeches below each groin ; and of the warm hip-bath. Four or five days after this attack commenced, the catamenia came on, and the pain, tenderness, and swelling gradually disappeared from the hypogastrium. This lady, the wife of an old acquaintance, was, some years afterwards, the subject of abscess between the vagina and rectum, which opened into the latter. She subsequently was attacked by gout ; and ultimately became consumptive, from an excessive addiction to brandy ; but was carried off by delirium tremens before the pulmonary disease had reached its utmost limits.

8. Ovaritis is often observed after delivery, but it is then rarely unconnected with metritis or metro-peritonitis, or with inflammation of the uterine and ovarian veins, or of the Fallopian tubes and connecting cellular tissue; but the associations of ovaritis, in the puerperal states, vary much with the prevailing epidemic, with the predisposing and exciting causes, and with the different circumstances in which the disease presents itself. These complicated forms of ovaritis are often observed in lying-in hospitals, in close ill-ventilated apartments, and in low crowded localities; and occur most frequently after difficult parturitions, after floodings, and upon the sudden disappearance or suppression of the lochia or milk.

9. ii. SYMPTOMS.—*A.* The *mild* and more *chronic* states of ovaritis, whether in the unimpregnated or puerperal states, is generally an insidious, latent, and deceptive disease, unless the nature of the case be strictly investigated. Indeed, in many instances, the complaint is not brought before the physician until it has gone on to structural change, or it is confounded with hysteria, from the circumstance of hysterical symptoms being its common attendant. In these cases, a careful examination will generally detect tenderness upon firm pressure, and sometimes even slight fulness or tumour, of either or both sides of the hypogastrium, a little above the groins, with slight febrile excitement; a variable, but usually a more frequent, pulse than in health, variability and excitement of the desires, emotions, and disposition, associated with many hysterical and nervous phenomena; irregularity or suppression of the catamenia; and costiveness, with scanty or varying conditions of the urine.

10. *B.* The more *acute* form of ovaritis is attended by nearly the same symptoms as the above, but more decidedly or acutely marked. The pain, tenderness, and swelling in the hypogastrium are more fully pronounced, the mind more evidently affected, and in the sanguine, the irritable, and plethoric, the desires inordinately excited, so as to amount almost to utero-mania. In some cases, numbness of one or both thighs is felt, particularly on that side where the fulness in the hypogastrium is most evident. Symptomatic fever and hysterical symptoms are sometimes also very prominent. The bowels are constipated, the urine scanty, and sometimes retained, occasionally it is voided in large quantity.

11. *C.* In the *puerperal state*, the symptoms vary remarkably with the prevailing epidemic and the causes and complications of the malady; and is often attended by general asthenia, by contamination of the circulating fluids, and by depression of the vital powers. But the occurrence of the disease in these circumstances, and thus associated, is fully considered in the article on PUERPERAL DISEASES.

12. iii. TERMINATIONS AND CONSEQUENCES.—*A. Resolution* is the most frequent issue of inflammation of the ovaries when the disease occurs independently of the puerperal states; and is indicated by subsidence of the pain and swelling; by the accession of the catamenia; or by a more abundant flow of the lochia when this discharge had been diminished or suppressed in the puerperal state of the disease. (See PUERPERAL DISEASES.)

13. *B. Softening and friability* are generally present in a greater or less degree when ovaritis is very acute and the swelling considerable. In this state, the organ is generally three or four times its natural size, or even larger. In addition to these changes it is infiltrated with a yellowish serum, or with a violet-coloured fluid, and occasionally it presents numerous small ecchymoses or bloody points.

14. *C. Suppuration* may occur in the puerperal, and in the non-puerperal states of the malady, but most frequently in the former. HILDENBRAND met with a case in the latter state, which opened externally and terminated favourably. Ovaritis is very commonly followed by suppuration in an advanced stage, when softening of the organ is very considerable, a puriform matter or serum, infiltrating the substance of the ovarium, partially breaking down portions of it, and forming either one large or more small abscesses. This result is often observed in the puerperal states, but the disease is then usually associated with metritis, or metro-peritonitis, and the case terminates fatally, from other changes in the pelvic and abdominal viscera and circulating fluids, before any large abscess is formed or breaks into adjoining parts. But in cases occurring independently of parturition, a considerable abscess is sometimes formed, which may open into the peritoneal cavity or into the rectum or some other adjoining viscus.

15. *D. Effusions* of a *puriform lymph or serum*, or of a *gelatinous lymph*, are sometimes observed upon the peritoneal surface of the inflamed ovaria and Fallopian tubes, the latter effusion often gluing their surfaces to adjoining parts. It is not improbable that, in the slighter and more chronic cases of ovaritis, a similar effusion of coagulable lymph takes place gradually into the structure of the organ, and occasions the enlargement, with various grades of *induration* observed in a few instances. In these latter cases, the enlargement of the organ is somewhat greater than that observed in acute ovaritis, amounting commonly to the size of an orange. It often remains stationary for a very considerable time, and affects but little the general health.

16. Whether or not the *Graafian vesicles* are ever affected by inflammation, excepting in common with the substance of the ovarium, it is difficult to determine. Purulent matter has been met with in cysts after ovaritis of a sub-acute or chronic character, but it has not been proved whether this arises from inflammation and suppuration of the vesicles, or is circumscribed abscess in the cellular tissue. Dr. SEYMOUR remarks that it would be still more difficult to say what is or would be the effect of inflammation of the *corpora lutea*,—that is, of vascular excitement greater than what is necessary for their formation; for their formation may be said to be owing to increased action of the vessels of the part. Corpora lutea form, in some cases, after rupture of the vesicle, independently of impregnation, owing to excited feelings connected with the generative system; and hence it is reasonable to expect that any morbid affection of the ovaria dependent upon such excited feelings would have their origin in the corpora lutea. In the cases on record, in which the ovaria were altered in structure, in conjunction with furor uterinus, no further information is generally given, than that puriform matter was found in the ovaria. The coats of the vesicle,

Dr. Seymour remarks, undergo in advanced life remarkable thickening; "and, instead of containing fluid, are filled with a thick matter of a red colour, from the presence of vessels, sometimes nearly solid, at others of a thinner consistence. This change exhibits on a small scale some of those hard tumours which are sometimes found in the parietes of an ovarian cyst. Is it not possible that these may be some of the superficial vesicles, having undergone the change alluded to, and magnified by disease?" The fluid contained in the Graafian vesicle is sometimes altered; it being red, or even black from the admixture of blood.

17. iv. Treatment.—The treatment of ovaritis should depend entirely upon the causes, the circumstances in which the complaint occurs, and the constitution of the patient. The means most beneficial when the disease is unconnected with parturition are generally either inappropriate or unavailing when it occurs at this period. The treatment of puerperal ovaritis is, therefore, comprised in the article on Puerperal Diseases.

18. *A.* The *slighter* states of the complaint require chiefly local depletions, as the application of leeches to the thighs a little below the groins, cooling aperients, and diaphoretics, with a mild unexciting diet and regimen. In the more *acute* cases, general bloodletting or cupping in the loins or sacrum, antimonial diaphoretics with nitre, small doses of camphor with nitre, the tepid bath, when much tension of the hypogastrium is complained of, and low diet, with perfect quietude, and the avoidance of mental and sexual excitements.

19. *B.* Where the *slighter states* of ovaritis occur in persons of the scrofulous diathesis, they generally become chronic, particularly in those who present indications of their having experienced scrofulous affections of glandular parts, and are commonly attended by severe pains, and much swelling or enlargement remains after the treatment now recommended. In these cases, abscess not unfrequently is formed, and all the symptoms are aggravated until it makes its way either into the rectum or vagina, the most favourable course it can take. If it burst into the peritoneal cavity fatal peritonitis is usually the result. In this form of the disease, small doses of the hydriodate of potash, with liquor potassæ, conium, and sarsaparilla; and injections, per vaginam, of emollient and anodyne fluids, or opiate suppositories, are chiefly indicated. I have prescribed suppositories consisting of the extracts of hyoscyamus and conium, and vaginal injections containing the same medicines with very marked relief. Dr. Seymour praises the extract of colchicum, given in the dose of a grain, twice or thrice daily.

20. *C.* When *abscess* forms in consequence of either acute or chronic ovaritis, and makes its way into the rectum, or vagina, or bladder, or even externally,—this latter being the most rare course it takes,—the strength of the patient ought to be supported, particularly in the scrofulous diathesis, by the preparations of cinchona, by suitable diet, pure air, and residence near the sea-side. Attention should be paid to the digestive functions, and moral and physical quietude should be recommended. The alkaline and chalybeate mineral waters may be subsequently tried.

III. Organic Lesions of the Ovarium, apparently independent of Inflammation.

Classif. — IV. Class. I. Order (*Author*).

21. i. Cysts, of various sizes, having their origin in some part of the ovarium, are the most frequent lesions to which this organ is liable. When one or more of these cysts contain fluid, the term *encysted* or *ovarian dropsy* has been given to the disease, although the serous cysts are sometimes formed in the broad ligaments and Fallopian tubes. These cysts are to be distinguished from hydatids, by their being nourished by vessels supplied to them from the parts in which they are found; whilst hydatids are parasitic formations, having an independent vitality, and are unconnected with the cyst containing them. One, or both ovaria, may be changed into simple cysts; and when the cysts are either numerous or large, the cellular substance and vesicles disappear, the fibrous coat of the organ becoming the fibrous covering of the cyst.

22. Dr. Seymour and M. Cruveilhier agree in considering this disease to originate in alteration or enlargement of one or more of the Graafian vesicles. When the enlargement takes place to a great degree, it is usually on the side nearest the proper coat, which often becomes distended to an enormous extent; the internal membrane of the cyst secreting a great quantity of fluid. When the cyst is single, the ovarian dropsy exists in its simplest state, and often in its greatest degree. When one, two, or more of the Graafian vesicles undergo the change, the disease consists of an equal number of cysts filled with fluid. The quantity of fluid furnished by this disease is sometimes very remarkable. In a case under the care of my friend Mr. Worthington of Lowestoft, the quantity of fluid taken away by him amounted nearly to as much as in the case detailed by Mr. Martineau, in which 6,631 pints were lost by tapping in 25 years.

23. The *symptoms* attendant on these tumours are not severe, and are occasioned chiefly by pressure on adjoining parts. When the tumour is seated low in the abdomen, pressure on the nerves and veins often occasions swelling and numbness of the leg and foot on the side where it is largest; but it may continue stationary for many years, or even for the greater part of a long life. In some cases the discharge of urine is more or less affected. The history of the case generally assists the diagnosis of this disease; but I must refer the reader to the article *Dropsy of the Ovarium*, for a full account of its symptoms, history, diagnosis, and treatment. (See art. Dropsy, §§ 198—213.)

24. ii. *Cysts* containing *fatty matter*, intermixed with *hair* and *teeth*, have been met with, either in the substance of one of the ovaria, or adhering to it by a narrow neck, and generally before the period of puberty; consequently they do not arise from impregnation. Similar cysts have been found in other parts of the body, in different individuals. They may be viewed as a species of monstrosity, termed by Ollivier and Breschet, "*Diplogénésis par pénétration*,"—as the result of an imperfect conception in the mother of the individuals in whom they are found. The *hair* found in these cysts varies in quantity and appearance. It may be isolated, or mixed with fatty

matter, or short or long, with or without bulbs. *Teeth* have usually been found implanted in fragments of bony or cartilaginous substance, or even of a part or the whole of a jaw.

25. iii. *Congestion* and *extravasation* of blood in the ovaria have not been satisfactorily observed. The former may possibly be of not unfrequent occurrence, either in connection with inflammation, or independently of it; and the latter has very rarely been seen to any great amount, unless in connection with ovarian fœtation.

26. iv. *Fibrous bodies*, resembling those found in the uterus, are occasionally found in the ovaria. They vary in size from a few ounces to 30 or 40 lbs. M. CRUVEILHIER met with a tumour of this kind which weighed 46 lbs. They can hardly be distinguished from similar tumours connected with the uterus. Indeed, they have been formed in one or both ovaria, and in the uterus also of the same subject.

27. v. *Cartilaginous*, *osseous*, and even *calcareous formations* are not unfrequently found in the ovaria. MECKEL considered them to originate in the Graafian vesicles. *Fibro-cartilaginous* transformations, with or without ossific deposits, are often met with in aged females. I have seen this change in a chlorotic female twenty-three years of age, who died of consumption, and had never menstruated, but without any ossific deposit. Calcareous deposits are more rare; but have been noticed by MORGAGNI, SAVIARD, PETERMANN, MURAT, and others.

28. vi. *Hydatids* are very rarely seen in the ovaria. Instances, however, of the occurrence have been adduced by CRUVEILHIER, ROUX, and DENEUX.

29. vii. *Tubercles* are also very rarely formed in the ovaria; but they have been found in this situation by DUGÈS, BOIVIN, SEYMOUR, TONNELÉ, and DUGAST.

30. viii. *Scirrhus of the ovarium* is not often observed. The organ is increased in size — sometimes remarkably; and the tumour is composed of a very solid substance intersected by fibrous membranes, running in various directions. Occasionally portions of the tumour contain cysts filled with secretions of various consistence. These scirrhous tumours very rarely ulcerate. In a case referred to by Dr. SEYMOUR, the scirrhous mass was breaking down into a thick, brown, fœtid fluid. This lesion is occasionally found in females who had scirrhus or open cancer in the uterus or some other part; and is attended by weight and pain in the seat of tumour, which is hard and moveable; and by signs of general cachexia.

31. ix. *Fungoid, and other malignant, tumours* are occasionally found in the ovaria. Some of these consist of a large cyst springing from the ovarium and containing within it tumours varying from the size of a pin's head to that of an orange. Sometimes a great portion of the parietes of the cyst is formed of tumours growing between the external and internal or secreting coat, the interior of the cyst having the tumours projecting into it, being filled with fluid secreted from the serous lining. The tumours, when divided, present a semi-fluid gelatinous substance, with white bands running through it, between which bands are smaller cysts, containing the same viscid, glue-like matter (SEYMOUR).

32. x. *Encephaloid or fungo-hæmatoid* tumours of very large size are formed in some cases in the ovaria. M. VELPEAU supposes them to be less rare than other malignant diseases of the ovarium. The encephaloid, or fungo-hæmatoid formation may exist in the same ovarium, or tumour, with the scirrhous structures, described above (§§), or with cartilaginous, fibrous, or fibro-osseous formations, as noticed by MECKEL, ANDRAL, and VELPEAU; but it may compose nearly the whole mass. The walls of the cysts in this disease are thick, and their cavities gradually enlarge until a tumour is formed which fills not only the hypogastrium, but the whole abdominal cavity. The outer surface of the tumour is unequal; in some points a fluctuation can be felt, while in others it has a hardness equal to bone.

33. This fatal malady occurs usually in younger subjects than those in whom the scirrhous and fungoid tumours already noticed (§§ 30, 31) are usually found. Dr. R. LEE remarks that it sometimes seems to be excited by impregnation. It runs its course with great rapidity; and the constitution of the patient is sooner affected by it, than by other diseases of the ovarium. It generally also coexists with cancerous or fungo-hæmatoid disease in other parts, as the pylorus, uterus, mamma, &c. It may be recognised by the unevenness, rapid growth, and hardness of portions of the tumour; by the occurrence of acute lancinating pains in it; by the simultaneous affection of other parts; by the general cachexia and rapid emaciation; by signs of anæmia; and by the very rapid, small, and feeble pulse, hectic fever, remarkable sense of sinking, and aphthous state of the mouth.

34. xi. *Melanosis* is very rarely observed in the ovaria. When it has occurred, it seems to have commenced, or been seated in the Graafian vesicles.

35. xii. *Encysted tumours* of the ovarium, as well as *malignant tumours*, have been supposed by Dr. BARON to arise from vesicles, formed by a change in the lymphatics of the part; the extremity of a lymphatic being closed, and thus forming, when distended with fluid, a pyriform vesicle. Dr. BARON has shown the important fact, that the diseases which are produced from these vesicles, as tubercles, encysted tumours, cancer, &c., may be artificially excited by bad food, impure air, insufficient nourishment, and confinement. Dr. HODGKIN supposes, that, in the formation of these tumours, a large cyst, which he calls the superior cyst, is first developed, from the inside of which tumours grow, of different sizes and shapes, pushing up the internal membrane of the superior cyst, which is reflected over them, as the pericardium and pleura are in the natural cavities of the body. These secondary cysts contain smaller. Sometimes the smaller cysts grow so fast as to strangulate one another, and the death of some of them causes altered appearances in the secretions of the part. Occasionally they burst through the reflected membrane, and present a fungoid and fringed appearance.

36. xiii. *Fœtuses* are occasionally developed in the ovarium, when some obstacle has occurred to the escape of the impregnated vesicle. Several cases of this occurrence are on record: one of the most interesting of these has been observed by Dr. GRANVILLE, and published in the Philosophical Transactions.

37. xiv. THE TREATMENT of the foregoing organic diseases of the ovarium, even when their precise nature is recognised, is frequently attended by little permanent advantage, beyond alleviating urgent symptoms and supporting the vital energies, and thereby resisting, for a longer period than might otherwise elapse, the fatal progress of the malady. Various alteratives have been advised for the removal of the tumours detected in this organ, such as the preparations of iodine, of mercury, liquor potassæ, conium, muriate of lime, &c.; and, when they are prescribed judiciously and cautiously, they are sometimes beneficial when the tumours are not malignant. Of these the most deserving of notice are the preparations of *iodine* and *liquor potassæ*. Of these preparations, the *iodide of potassium* alone, or with the liquor potassæ, *conium*, or *sarza*, or with all of these, and the *iodide of iron*, have appeared to me the most beneficial. I have employed them since their first introduction into practice; but always in smaller doses than were or are usually exhibited; and generally in combination with vegetable tonics or alteratives. In malignant tumours, however, of the ovarium little or no benefit will be derived even from them, beyond the support they may afford to the constitutional powers. The iodide of potassium, however, when conjoined with full doses of liquor potassæ, conium, or other narcotics and anodynes, not merely accomplishes this intention to a certain extent, but also affords considerable alleviation of the more painful or urgent symptoms.

38. Dr. SEYMOUR states that the *liquor potassæ* given in as large doses as the stomach will bear, has appeared to produce in diseases of a malignant nature, more alleviation than any other remedy; particularly in those tumours that are not attended by acute pain, or any considerable symptomatic fever.—Next to the liquor potassæ Dr. SEYMOUR ranks the *muriate of lime* in the treatment of the non-malignant tumours of the ovaria. It has received from Dr. JAMES HAMILTON much praise in the treatment of encysted dropsy of these organs, but it is of doubtful efficacy in other organic lesions; unless such as are of a scrofulous nature, and these are not frequently observed in the ovaria.

39. *Conium* formerly obtained some reputation in scrofulous and malignant tumours, and has been frequently employed in cases of organic disease of the ovaria; but I doubt its possession of any efficacy beyond that which may be derived from its narcotic and anodyne properties. When medicines possessed of these properties are required, the preparations of *opium* or morphia, of *belladonna*, or even of *aconite*, may be brought in aid of other means, or may be conjoined with the preparations of iodine, of iron, of camphor, &c., according to the circumstances of individual cases. In the malignant diseases of the organ they are often of service as palliatives, and are advantageously conjoined with these or with the liquor potassæ or the bromide of potassium. This last substance, however, is more likely to be of service in the non-malignant tumours of the ovarium, in which, however, it has not received sufficient trial.

40. *Of extirpation of the diseased ovarium* some notice has been taken when discussing the *treatment of dropsy of the ovarium* (see art. DROPSY (§ 208. *et seq.*); and I have little to add to what I then remarked. Since that was written, however, this operation has been performed successfully by several surgeons; and in three cases, by Mr. WALNE; the great majority of cases being those of dropsy of this organ. Whilst this success places the operation in a more favourable light than that in which it was formerly held, still the great dangers and contingencies connected with it, which I have noticed in the article referred to, should not be overlooked; nor should it be attempted without due discrimination of the nature and morbid relations and connections of the disease.

III. DISPLACEMENT AND HERNIA OF THE OVARIUM.

41. i. One ovarium, very rarely both ovaria, may be *displaced*, either independently of, or consequently upon, organic lesions of it. The displacement may also be connected with adhesions of the ovarium to adjoining parts, or it may be without adhesion. When thus displaced, the ovarium may be useless in respect of its generative function, sterility being the result.

42. ii. Displacement of the ovarium is not infrequently met with to the extent of constituting a *hernia* of it. The ovarium may protrude through — 1st. The *inguinal ring*, the most common form of ovarian hernia; — 2d. The *crural canal*; — 3d. The *ischiatic foramen*; — 4th. The *umbilical ring*; — 5th. any accidental opening in the *abdominal parietes*; — and 6th. into the *vagina*. Hernia of the ovarium is very rarely met with in any of these situations, excepting the first. The hernia may be *reducible*, or *irreducible*, *simple*, or *complicated* with organic lesion of the organ, or with adhesion of it to adjoining parts; and it may be *strangulated*. But these displacements, and more particularly the treatment of them, concern the surgeon more than the physician.

BIBLIOG. AND REFER. — *Fontaine*, in *Haller*, Disser. ad Med. Pract. vol. iv. 1751. — *J. Sidren*, Casus Sphaceli Ovarii, 4to. Upsal, 1768. — *J. Kruger* et *G. D. Motz*, in *Doering's* Tract. vol. i. — *J. C. G. Iorg*, Aphorismen ueber die Krankheiten des Uterus und der Ovarien, 8vo. Leips. 1819. — *Murat*, Dict. des Sciences Med. t. xxxiv. art. *Ovaire.* — *Philips*, Trans. of Med. Chirurg. Soc. of Lond. vol. ix. p. 427. — *Bostock*, in ibid. vol. x. p. 77. — *Dalmas*, Journ. Hebdom. de Méd. t. i. p. 114. — *J. Copland*, Lond. Med. and Surg. Journ. vol. v. p. 58. — *J. Lizars*, Observat. on Extraction of diseased Ovaria, fol. Edin. 1825. — *Andral*, Précis. d'Anat. Patholog. t. iii. p. 708. — *Cruveilhier*, Anat. Patholog. livr. v., xiii., xviii., and xxv. — *E. J. Seymour*, Illustrations of the Principal Diseases of the Ovaria, 8vo. with plates, Lond. 1830. (*A very able Work.*) — *Addison*, in Guy's Hosp. Reports, vol. i. p. 41. — Archives Gén. de Méd. t. xx. p. 92. (*Cases of Extirpation of Ovarium.*) Edin. Med. and Surg. Journ. vol. xxix. p. 305. Med. Gazette, vol. xvi. p. 673. Med. and Chirurg. Review, July 1836, p. 38. — *M. Boivin* et *A. Dugés*, Traité Prat. des Maladies de l'Uterus et de ses Annexes, 8vo. Paris, 1833. cum fig. — *T. Ameke*, De Ovariorum Degenerationibus eorumque Signis et Causis, 8vo. Berl. 1834. — *R. Lee*, Cyclop. of Pract. Med. vol. iii. p. 225. — *Cruveilhier*, in Dict. de Méd. et Chirurg. Prat. t. xii. art. *Ovaires.* — *Martin Solon*, in ibid. t. xii. art. *Ovarite.* — *H. Dugart*, De l'Exploration des Ovaires, 4to. Paris, 1839. — *Lowenhardt*, in Brit. and Foreign Med. Review, Oct. 1836. p. 529. — *R. Bright*, in Med. Chirurg. Review, July 1838. p. 219. — *G. A. Spitta*, Quædam de Ovariorum Morbis, 8vo. Berl. 1839. — *Velpeau*, in Dict. de Méd. 2d edit. art. *Ovaires.* (See also BIBLIOG. AND REFER. to art. DROPSY OF THE OVARIUM.)

OZÆNA (from ὄζω, I smell.) — SYNON. — *Ozene*, Fr. *Stinkende Nasengeschwür*, Germ.

CLASSIF. — IV. CLASS. II. ORDER (*Author.*)

DEFIN. — *A discharge of a fœtid, puriform, or sanious matter from the nostrils.*

1. *a.* This disease is generally *symptomatic* of ulceration of the membrane lining the nostrils, the palate, maxillary and frontal sinuses, &c., or of

caries of the bones in these situations, and always attends *syphilitic disease* of these parts. It may accompany also *scorbutic*, *scrofulous*, and *cancerous affections*, either in these situations, or in the vicinity. A slighter form of it sometimes follows *chronic coryza*, particularly in scrofulous constitutions, in the cachectic, and in those of a lax and leucophlegmatic temperament. In some cases, the matter secreted is scanty, but it is often attended by the discharge of fœtid crusts. This state, as well as other states, of ozæna may follow or attend *malignant scarlet fever*, and *erysipelas* of the face. In a case lately treated by Sir B. BRODIE and myself, the ozæna, with consistent crusts, was occasioned by an injury of the nose received when hunting; and was followed by erysipelas of the face and head; the ozæna, however, continuing, in a slighter form, after the erysipelas was cured.

2. *b.* The *progress* of the disease is generally slow; and it is rarely attended by acute pain, unless when caused by cancer. Hence it is often neglected until the bones are affected, when it proceeds from chronic inflammation and ulceration of the membrane. In some cases, however, an aching is complained of.

3. *c.* The *prognosis* should depend upon the nature of the pathological causes of ozæna, or of the disease of which it is a symptom. If there is reason to infer the existence of caries of the bones of the parts above named, the prognosis should be either unfavourable or guarded.

4. *d.* The *treatment* ought likewise to depend upon the origin, or cause of the discharge; but in all circumstances it ought to be both *constitutional* and *local*. — (*a.*) The *former* should consist of tonics, conjoined with alteratives, as the liquor potassæ with the preparations of sarza, and in some cases also with the iodide of potassium; or the preparations of bark, either with alkalies, or with the hydrochloric or nitric acids, or with both these acids. A dry pure air, or residence near the sea-side, and light nutritious diet, are generally also beneficial. If the ozæna proceed from *syphilis* or *scurvy*, the treatment suitable to those maladies should be prescribed.

5. (*b.*) The *local* measures consist chiefly of weak injections of the chlorides, particularly of the chloride of lime, or of the chloride of potash, or the passage of a stream of tar-water, or of fluid containing either creasote, or a small quantity of the sulphate of zinc, or of nitrate of silver, or of alum, through the fauces and nostrils. The local as well as the constitutional treatment, however, should be guided by a careful inspection of the parts, and by a correct estimate of the existing extent of mischief, as well as of the exciting and concurring causes. In some obstinate cases, the ozæna have been cured by a seton in the nape of the neck.

BIBLIOG. AND REFER. — *Paulus Ægineta*, l. iii. ch. 24. — *Avicenna*, Canon. l. iii. feu. 5. tr. i. cap. l. 3. — *J. G. Gunz*, Program. Observat. ad Ozænam Maxillarum ac Dentium Ulcus pertinentem, &c. 4to. Lips. 1784. — *J. P. Frank*, De Curand. Hom. Morbis, l. v. p. 112. — *Percy* and *Laurent*, in Dict. des Sc. Med. t. xxxix. p. 72. — *Blaud*, Révue Méd. 1825. t. i. p. 447. — *Johnson's* Med. and Chirurg. Rev. Oct. 1836. p. 514. — *Cullerier* et *Ratier*, in Dict. de Med. et Chirurg. Prat. art. *Ozène*. — *G. F. Most*, Encyclopadie der Gesammten Medinisch. und Chirurg. Praxis, b. ii. p. 539.

END OF THE SECOND VOLUME.

London:
Printed by A. Spottiswoode,
New-Street-Square.